Model Railroader
SPECIAL ISSUE

Modeling mainline action in N scale p. 14

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WINTER 2016

80 pages of projects for your layout!

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Lance Mindheim's layout on page 6 highlights the colors of modern railroading.

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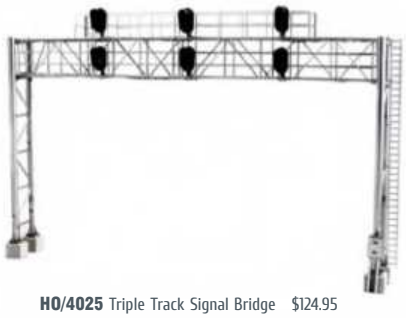

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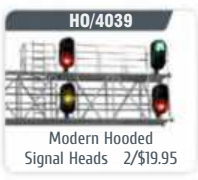

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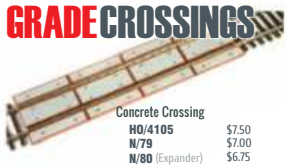

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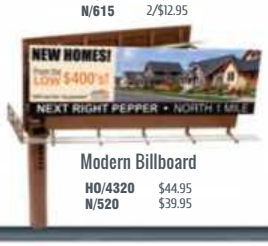

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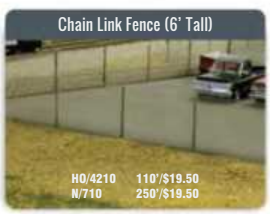

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ON THE COVER: The gritty industrial scenery of the back streets provides a backdrop for Lance Mindheim's Miami layout. See page 6. Photo by Lance Mindheim

LOOK AROUND, THEN BUILD

THE MODERN RAILROAD SCENE is a colorful, dynamic, and interesting place. It's the world in which we exist, where we can see the trains, the facilities, and the details that draw our interest like a very strong magnet.

We can go trackside and watch trains run, whether it's on a main line or in an industrial park. We can see and record in photographs and video the towns and cities through which they run as well as the industries they serve. We can see how the track, bridges, buildings, and everything else that makes a railroad run are constructed.

Best of all, we can re-create almost all of it in a smaller scale on our layouts.

Many manufacturers of model railroad products make accurate, highly detailed scale models of the locomotives and rolling stock you can see running in freight and passenger service today. They also produce versions of the industries and other buildings you see along the rights-of-way. Digital Command Control and computer-controlled signaling systems allow modelers to run their layouts almost like the prototype, too.

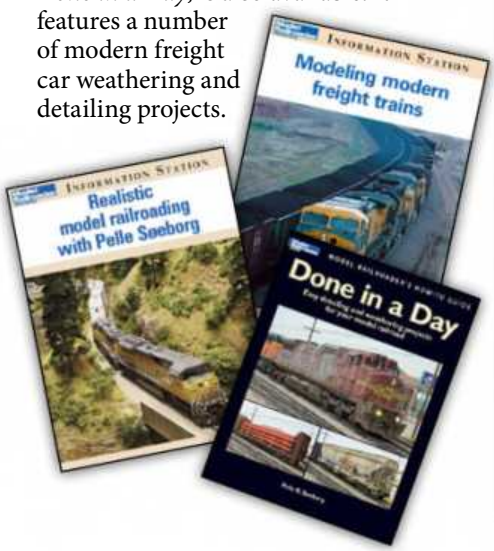
All this gives you a head start to creating your own modern-day layout, or maybe it will inspire the re-imagining of an existing one.

There's plenty of room for your own imagination to roam, too. You're not limited to merely modeling railroads that exist in the 12-inch-to-the-foot world; you can come up with your own freelanced contemporary lines. They may have connections to prototype railroads on your layout, or perhaps they only run as far as your benchwork does.

Regardless, there's a lot to love about modeling today's railroads. Whether it's long trains you love, or commuter operations, or short lines, it's all waiting to be seen and modeled. Get to it!

FOR MORE INFORMATION

IF YOU'RE LOOKING for more advice on modeling the modern railroad scene, visit the Kalmbach Hobby Store, www.kalmbachhobbystore.com. PDF packages are available for download, including *Realistic Model Railroading with Pelle Søeborg* and *Modeling Modern Freight Trains*. Pelle's book, *Done in a Day*, is also available. It features a number of modern freight car weathering and detailing projects.



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SECTION 1

MODERN ERA LAYOUTS

CSX EMD GP38-2 no. 2771 threads through Lance Mindheim's CSX Miami Downtown Spur HO scale model railroad. Lance combines modern scenes with classic railroad operations in his take on modeling the modern era.

A layout doesn't need the wide-open spaces of a giant basement

EDITED BY ERIC WHITE

EVERYONE KNOWS WHAT MODELING THE MODERN ERA IS, RIGHT?

It's gritty, urban, switching in a warehouse district.

Or is it high-horsepower diesels hauling units trains through sweeping curves?

What about a layout that's been around for decades and was modern when it was first built, and is still modern today?

All of these answers are true, and there are others out there as well.

Lance Mindheim is fascinated by the operations of the Downtown Spur in Miami. Although the scenes are modern, the operations are similar to railroading in the post-war era with single-car loads, street running, and team-track activity.

What makes it modern is the scene, and the modern safety procedures employed.

At the other end of the spectrum, and the other side of the country, is Jim Reising's Oakville Sub. The California setting hosts the BNSF Ry. and Union Pacific. Long trains of intermodal freights wind through wide-open Southwestern desert scenery. Modeling in N scale, Jim has room for 100-car staging yards for his railfan-oriented layout.

In addition to freight trains, Jim's model railroad hosts Amtrak trains, and he's modeling current track technology with concrete ties on his main line.

Then there's Eric Brooman's Utah Belt. The model railroad is more than 30 years old, and in its second location, but time doesn't stand still. Eric started out modeling the modern era in the '70s, and is still at it today.

That means as motive power changes have come to full-sized railroads, they've also arrived on the Utah Belt. In addition, Eric has upgraded signal systems to reflect current practice, and even the structures and industries are keeping up with the times, such as the aluminum-bodied coal hoppers and the flood loader at the U.S. Carbon mine.

So here are three ideas of what it means to model the modern era. Perhaps you'll find inspiration to develop your own take on the concept, and show us another option no one has seen before. HTMTR

MODELING MIAMI'S DOWNTOWN SPUR

An urban light-industrial setting provides plenty of switching

BY LANCE MINDHEIM • **PHOTOS BY PAUL DOLKOS**

1. The Miami Produce Center is an open-air courtyard operated in a team track fashion on Lance Mindheim's HO switching layout. Arriving carloads of fresh produce are spotted in the lot so customers can pull up and transfer the items into small box trucks or pickups.

2. Family & Son, a major importer and producer of Latin American food products, is one of the more active customers on the branch. This view shows the southbound local passing the concrete loading dock for the Family & Son warehouse.

THE HUMIDITY IS FIRST THING

that hits you as you step out of the front door at Miami International Airport. Weather statistics don't convey the shock of its impact the first time you walk into it, particularly if you're from up North. Second is the smell of the ocean air. As you cruise down 22nd Street, parallel to the industrial spur I model, palms and Live Oaks arc overhead. Latin music pipes out of the open doors of the dozens of produce warehouses, and numerous signs indicate English is a second language.

Not only do you have the sense of being in a place like no other, when it comes to the rail scene, you feel transported to times past. As in the bygone era of the 1950s, industries still routinely take single-car loads, team tracks are common, and street running still exists.

The Santeria religion is prevalent in the area, including the regular practice of "chicken in a bag" animal sacrifices via locomotive. In an attempt to ward off bad luck, a live chicken and a wad of cash are stuffed in a bag and draped over the rails. The belief is that once the locomotive squashes the bag and its contents, the believer's fortunes will improve for the better.

SOMETHING DIFFERENT

After modeling the traditional steam-to-diesel transition era for many years, I was ready to try something different. Miami serves up "different" in large doses. I was also ready to try a new era and was intrigued by the idea of modeling the present. Whether it's 1950 or 2015, the methods of spotting a car haven't changed. If anything, it's more interesting today due to the added safety procedures employed. Getting accurate prototype information is also much easier in today's world.

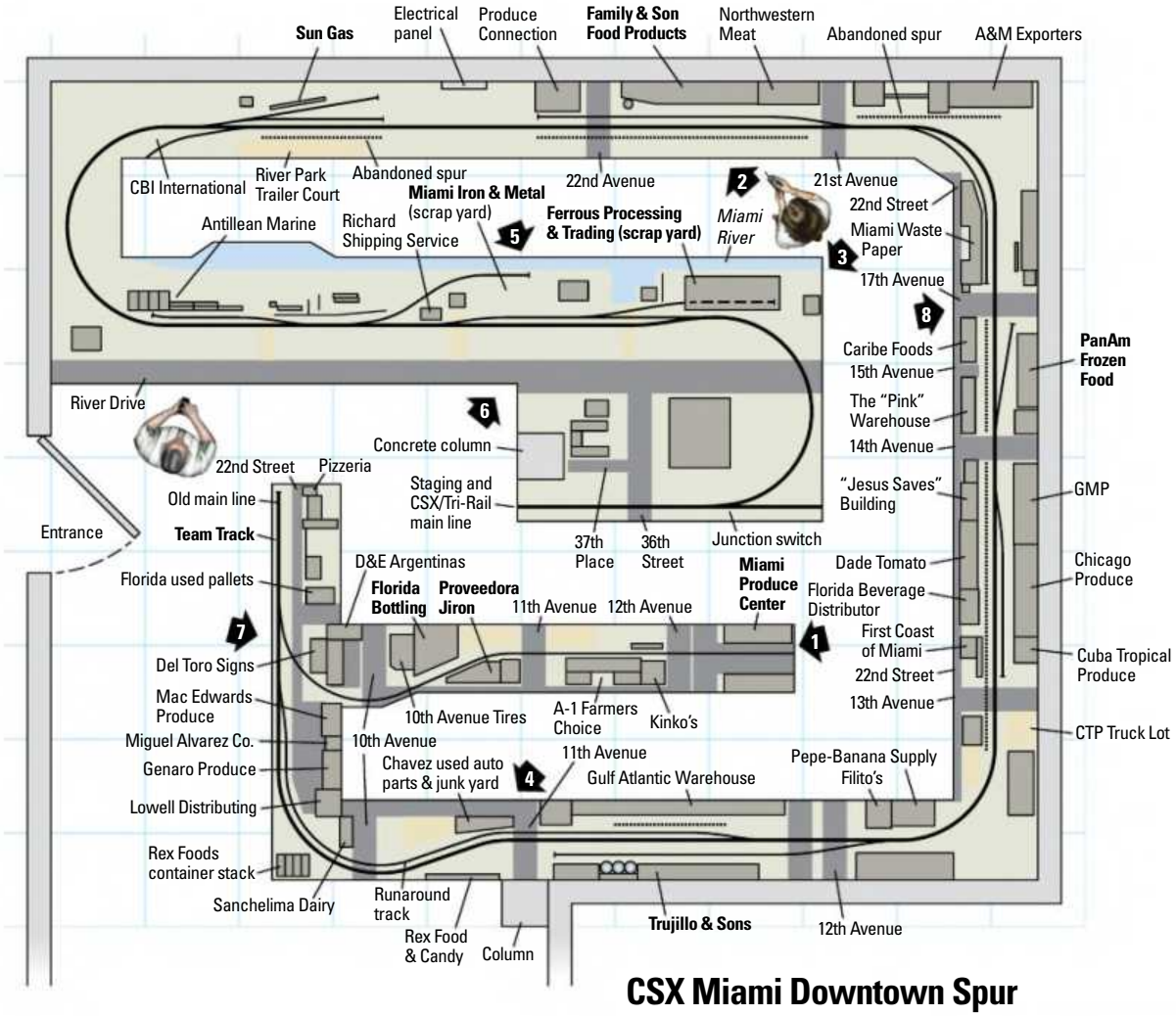
Miami offers more than most cities in terms of the number of industrial parks that would make great modeling themes. Ultimately I decided on the Downtown Spur, a 3½ mile branch of CSX near the airport. It hugs the banks of the Miami River for a mile, and then makes a straight shot east toward downtown before the rails disappear into the pavement at Seventh Avenue.

This spur is switched regularly, sometimes with two shifts during good economic times, and it has a tremendous variety of lineside industries.

The first mile of the branch serves a scrap metal business, a waste oil recycler, and a propane dealer. The balance of the line serves a variety of small food businesses that receive loads in boxcars, reefers, and vegetable oil tankers. Unlike the more modern structures we typically see trackside, those along the spur tend to be older, small, weather-beaten stucco affairs that only handle a car or two.

PULLING IT OFF

Most modelers want to capture a miniature version of a place or time that evokes strong and pleasant memories. To effectively pull off this theatrical sleight-of-hand requires an understanding of the factors that contribute to a successful model and putting your efforts there. If you want to feel like you're actually "there" when you enter the basement, your efforts need to be focused on scene composition (particularly keeping elements far enough apart), correct handling of color, scenery, and a commitment to neatness. If you work from photographs and apply these



CSX Miami Downtown Spur

HO scale (1:87.1)
Layout size: 17 x 21 feet
Scale of plan: ¼" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Boldface names indicate railroad customers
Illustration by Rick Johnson

Find more plans online in the ModelRailroader.com Track Plan Database.

Now on ModelRailroader.com

To see Lance Mindheim's CSX Miami Downtown Spur modeling in action, you can check out the User Videos section of our website by visiting **www.ModelRailroader.com.**

THE LAYOUT AT A GLANCE

Name: CSX Downtown Spur
Scale: HO (1:87.1)
Size: 17 x 21 feet
Prototype: CSX
Locale: Miami
Era: 2007
Style: walk-in
Mainline run: 89 feet
Minimum radius: 24"
Minimum turnout: no. 6
Maximum grade: none
Benchwork: hollow core doors along walls, open-grid peninsulas
Height: 54"
Roadbed: none
Track: code 70
Scenery: extruded-foam insulation board
Backdrop: painted room walls
Control: CVP Easy DCC wireless

CSX Miami, Fla., Downtown Spur
Not to scale

3. Ferrous Processing & Trading, know locally as FP&T, buys scrap metal and shreds it to a uniform size before the processed material is loaded into gondolas. In this view, the CSX local crew will pull the pair of loaded scrap gons.

4. Numerous small family businesses, like Chavez Used Auto Parts, are scattered throughout the neighborhood between the railroad customers. Here, the local crosses 10th Avenue as it heads north toward the CSX connection at 36th Street.

principles, you'll get the visceral feeling you're after.

Even if your modeling is flawless, you can still fall short. Successfully capturing the feeling and mood of the area you're modeling entails sitting back for a moment to consider the area's defining features. A distinction has to be made between the common and ordinary elements that make a place what it is versus the typical model railroad approach of cherry-picking all the extraordinary features. In "my" Miami planning, the signature elements are the palms, the river scene, and the unique structures.

PALM TREES

Nothing says you're in Miami more than the ubiquitous palm trees. There simply isn't any hope to create a replica of the area without them. I wasn't happy with the appearance of ready-made palms on the market. To me, taking the easy way out and using them would have been visually jarring and ruined the effectiveness of any work I did in other areas.

If you want high-quality palms, they're available from Hart of the South (www.hartofthesouth.com), provided you're willing to build tree "kits." Since the palms are such a signature element, I decided the time to model them was well spent.

THE RIVER SCENE

It's really an odd feeling to be driving along a street with a five-story-high ship gliding by a few yards away behind the tree line. Many visitors are unaware that Miami actually has two active ports. In addition to the large and more typical Port of Miami, the Miami River inland port serves a string of small shipping companies whose names tip off the destinations they serve: Antillean Marine, American Caribbean Terminal, Trans-Haiti Shipping, and many others.

The Miami River scene defies belief in terms of plausibility. At many points, the river is only a few yards wider than

5. Miami Iron and Metal is another scrap-metal dealer along the river corridor. Unlike its competitor, MI&M doesn't shred the metal, but the scrap materials are sorted into various categories before they're loaded. Miami Iron ships its out-bound scrap loads in formerly utility-owned high-side coal gondolas.

MODELING MIAMI'S STRUCTURES

THE BASIC ARCHITECTURE of Miami's industrial structures is relatively easy to model, since most of it consists of masonry blocks covered with stucco. Construct a four-wall cube, and the base structure is essentially complete.

It's the pastel surface coloring that's unique and a challenge to model. Hand-painted murals and signs are common. Over time, the original artwork begins to fade, peel, and occasionally gets covered with graffiti. Modeling this convincingly using traditional techniques is nearly impossible. Since I had access to the area, I opted to use a photo-lamination approach. I simply photographed the structure, cleaned up the image using my computer's image editing software, and glued the finished photos to my styrene cube. Then, to add some visual depth to the flat walls, I added three-dimensional details such as awnings, rain gutters, steps, and loading docks.

My article "Building a modern shelf switching layout" appeared in *Model Railroad Planning 2009*. It featured a look at this layout during the planning phases and included a number of prototype photos. At the time it was written, construction had not started. It's also important to note the plan shown here is different from the one in that article. – *L.M.*

7. Here's the local backing slowly into a switchback as it crosses 22nd Street with a mechanical refrigerator car. The crew has to continue this move for about three blocks before it can spot the load at the Miami Produce Center.

the ships that ply it. The vessels that thread upstream tend to be very short, 300- to 500-foot-long container ships, barges, and ferries. Their hulls are streaked with rust and the ships seem to be a Frankenstein kitbash of whatever the shipyard could pick up on the cheap, including World War II landing craft. Given their short length and questionable seaworthiness, most of the ships primarily ferry vehicles and goods to nearby island nations of the Caribbean. Being able to work in some marine modeling with this layout is a welcome treat.

STRUCTURES AND SCENES

One of the great lessons I learned from my mentors is the importance of modeling the ordinary. As I decided

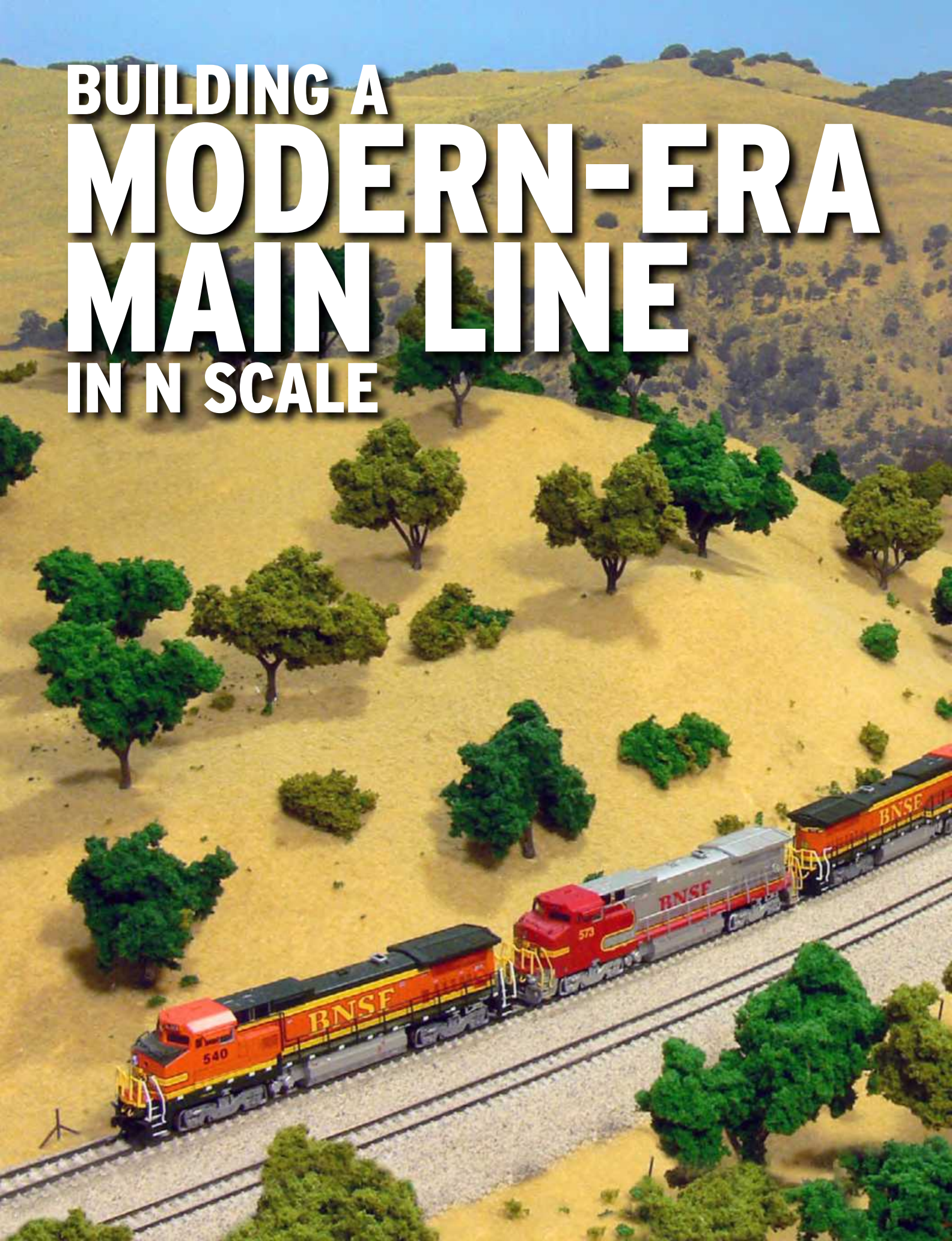
6. A Trackmobile moves loaded gondolas from Ferrous Processing & Trading onto a siding. Empty cars have already been spotted under the shed at right in the background.

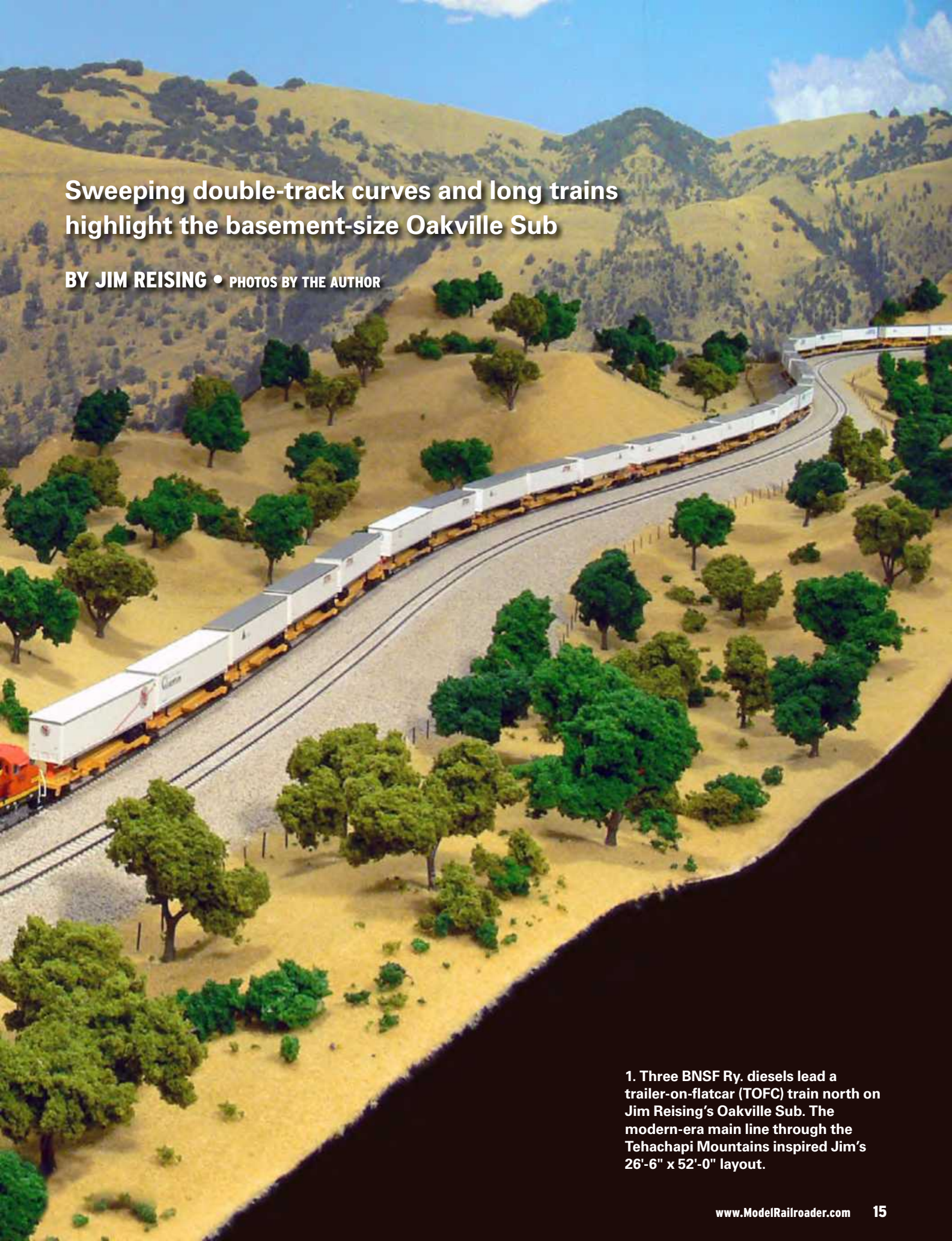
which features made it onto the layout, I worked very hard to keep my emotions out of it. No consideration was given as to whether a structure was rail-served or not, or whether it had interesting architecture. If a building was in the scene, I included it without judgment.

Miami's interesting culture and rail scene never cease to fascinate me. I can't visit the city as often as I'd like, but thanks to photography I've captured the spirit and flavor of the area enough that I feel like I'm taking a railfan vacation when I step into the layout room. HTMTR

8. The lines of sight are obstructed approaching the 17th Avenue crossing, so the conductor often takes a position on the front platform as a safety measure while the locomotive crawls through the intersection.

BUILDING A MODERN-ERA MAIN LINE IN N SCALE





Sweeping double-track curves and long trains highlight the basement-size Oakville Sub

BY JIM REISING • PHOTOS BY THE AUTHOR

1. Three BNSF Ry. diesels lead a trailer-on-flatcar (TOFC) train north on Jim Reising's Oakville Sub. The modern-era main line through the Tehachapi Mountains inspired Jim's 26'-6" x 52'-0" layout.

2. The staging yard stretches under the layout in the south room. The control panel features lights connected to occupancy detectors that help Jim monitor the hidden track in the staging yard under the main line.

3. Oakville features two control panels: one for the yard throat (center) and the other for the yard ladder (right). The layout is high enough at this location to give Jim a comfortable work area underneath the benchwork.

MILE-LONG FREIGHT TRAINS

snaking through the Union Pacific's Mojave Subdivision inspired my N scale Oakville Sub. The prototype for my model railroad is a section of the UP main line from Bakersfield to Tehachapi, Calif. The main differences between the prototype and my N scale version are that my entire main is double-tracked and all the tunnels have been "daylighted" or turned into cuts. This has actually been occurring on more and more of the prototype line.

I also didn't model Tehachapi Loop. Several of my early track plans included the loop, and everyone who models Tehachapi seems to model the loop. I wanted to do something different.

I designed my layout primarily for railfanning freight trains. The main line features a long run and broad curves. Each track in staging and Oakville Yard can hold more than 100 N scale freight cars. The layout is tall enough to keep the trains close to my eye level.

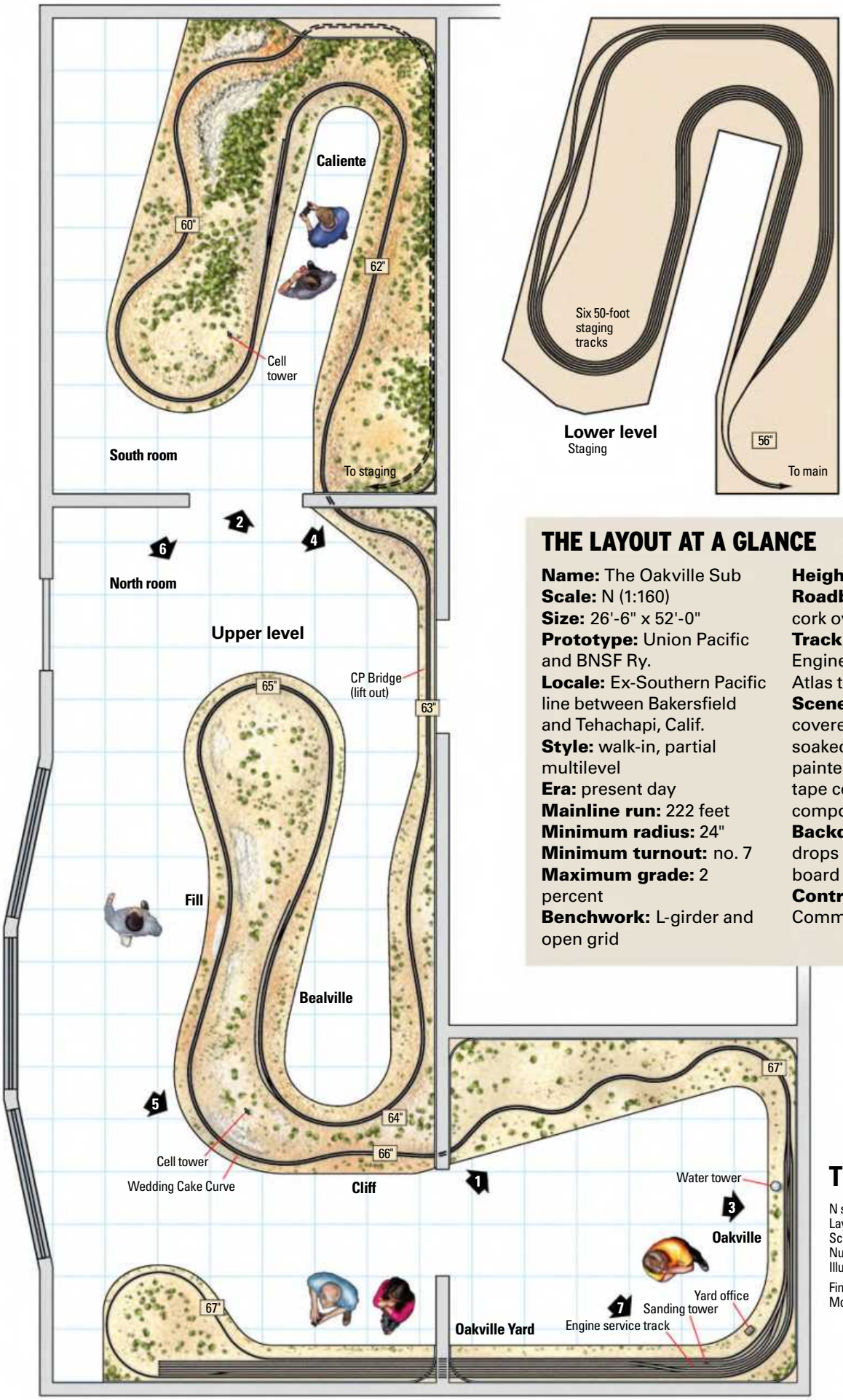
After adding some crossovers and sidings for operating flexibility, I was satisfied with my plan. It was time to get to work.

BASEMENT AND BACKDROPS

At the beginning of 2008 I got my basement ready for a model railroad. Where I live in Tennessee we have a wide range of outside temperatures, so finishing the basement was an important first step. The layout takes up two rooms: the north room and the south room.

This project included building 2 x 4 stud walls inside the concrete block walls. After adding wiring and insulation, I had drywall installed. The floors in the layout rooms are laminate with double foam backing, so the surface is easy on my feet. I installed a suspended ceiling and compact fluorescent can lights above the layout.

By June 2008 I began layout construction by installing the backdrops. First, I marked the height of the layout, and then attached tempered hardboard to the walls with screws. After coving the corners and painting the hardboard,



THE LAYOUT AT A GLANCE

Name: The Oakville Sub
Scale: N (1:160)
Size: 26'-6" x 52'-0"
Prototype: Union Pacific and BNSF Ry.
Locale: Ex-Southern Pacific line between Bakersfield and Tehachapi, Calif.
Style: walk-in, partial multilevel
Era: present day
Mainline run: 222 feet
Minimum radius: 24"
Minimum turnout: no. 7
Maximum grade: 2 percent
Benchwork: L-girder and open grid
Height: 56" to 67"
Roadbed: cork sheet and cork over spline
Track: code 55 Micro Engineering flextrack and Atlas turnouts
Scenery: cardboard lattice covered with plaster-soaked paper towels or painter's rags or masking tape covered with joint compound
Backdrop: photo backdrops on tempered hardboard
Control: Digitrax Digital Command Control

The Oakville Sub

N scale (1:160)
Layout size: 26'-6" x 52'-0"
Scale of plan: 3/16" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

Find more plans online in the ModelRailroader.com Track Plan Database.

4. Two Electro-Motive Diesel SD70ACe locomotives with a General Electric ES44AC in between haul an auto parts train toward Caliente.

5. The terraced rock face is the result of a tunnel "daylighting" operation. The opening in the wall behind the Amtrak train leads to Oakville.

I attached printed backdrops to the hardboard with rubber cement.

All of the photo backdrops on the layout are from Backdrop Warehouse (www.backdropwarehouse.com). The firm sells several scenes from the Tehachapi Mountains, including Caliente.

STAGING

The key to the layout's design is the staging yard, so that's where I started building. The benchwork is L girder and open grid made from 1 x 4s supported by 2 x 2 legs. The tabletop is ¾" plywood.

I adhered cork roadbed to the plywood using latex caulk. I also used latex caulk to install the track.

Most of the track in the staging area is Micro Engineering flextrack left over from my previous layout. Since these tracks are hidden, the simulated wood ties weren't an issue. I ordered no. 8 turnouts for the staging yard from Prototrack, a custom turnout builder that I found on the www.Trainboard.com N scale forum.

I also installed infrared occupancy detectors in the yard. The detectors are connected to lights on a control panel that illuminate when a train is on that particular track.

While waiting for the turnouts to be built, I wired the rest of the staging tracks. Since this track is hidden, it had to be bulletproof. I wanted to avoid derailments and stalled engines. On July 20, 2008, I ran the first test train on the staging tracks. Seeing that train operate without problems felt great!

BUILDING SPLINE SUBROADBED

Jim used spline subroadbed for most of the main line. The spline is made of laminated strips of tempered hardboard.

FOR MOST OF THE OAKVILLE SUB'S main line I used spline subroadbed made by laminating strips of tempered hardboard (Masonite). The resulting subroadbed made it easy to achieve the graceful, broad curves on my layout. This technique isn't that difficult, but it does require a table saw. The hardboard will wear out the saw blade relatively quickly. It's also important to work in a well-ventilated area and to wear a dust mask and eye protection.

For my layout I used five 4 x 8-foot sheets of ⅛" tempered hardboard.

I had my local home improvement store rip each sheet into 1 x 8 foot sections. Using my table saw I then ripped each section into 1" wide strips. This width made the 8-foot long strips easy to bend. I took my time to make sure that each cut was as straight as possible.

I used seven strips for the subroadbed under each track of my double track main line. Each successive strip was cut 1 foot shorter than the previous one. The stepped end provided an overlapping joint with the next section of splines.

I began by nailing the first 8-foot long strip to the risers. I laminated the next strip to the first with wood glue and clamped the splines in place until the glue set. I used a lot of clamps for this project, placing them at 6" intervals along the spline. After the glue set, I followed the same procedure for the next five strips. Using ½" spacers as a guide, I then repeated the process for the parallel track.

I kept working down the double-track main by gluing strips to the stepped ends of the previous section. When a couple sections were complete, I wrapped a scrap piece of 2 x 4 with coarse sandpaper and smoothed the top surface before I installed the cork roadbed.

I checked my work often using a torpedo level. I also had a little time before the glue set to make any final adjustments. Installing spline subroadbed can be tedious, especially at the beginning, but I think the finished results are well worth the effort. – *J.R.*

LAYING THE MAIN LINE

After installing the turnouts and some final testing, the staging yard was done. For the main line I used spline subroadbed, which is made of strips of hardboard laminated together and attached to risers. [See "Building spline subroadbed" above. – *Ed.*] This technique helped me achieve graceful, sweeping curves.

Once I installed strips of cork roadbed, it was time to lay track. The visible main line track is Micro Engineering code 55 flextrack with simulated concrete ties, which is appropriate for my prototype. The track can be a bit stiff

7. At Oakville Yard, BNSF Ry. engines take sand as an auto rack train passes on the main line. As on the prototype Mojave Subdivision, the main line track is on concrete ties, while the yard track is on wood ties.

when bending curves, but the curves will stay put. And I really like that the track is available factory-weathered.

The rails on every section of track on the layout are wired to the power bus. I use 26AWG wire for feeders. This is especially important on the main line, since I don't use rail joiners or solder rails together.

I used Atlas code 55 no. 10 turnouts for the crossovers on the main. The prototype UP line has turnouts laid on wood ties, so the simulated wood ties on the Atlas turnouts wasn't an issue.

After I finished the lift-out CP Bridge across the doorway, I built a temporary turnaround loop on ¾" plywood. There's no better way to find track and wiring problems than by running trains of the equipment you intend to use. This testing helped me find and correct a few problems, including realigning the grade coming up out of staging.

I then continued building benchwork and laying track, including the large peninsula in the middle of the room, until I reached the Oakville Yard throat. At that point I switched from spline to a ¾" plywood tabletop for the yard benchwork. Before starting on Oakville Yard, I set up another temporary loop for testing.

6. Jim built the mountains on the peninsula in the north room by covering a web of cardboard strips with plaster-soaked paper towels. He later revised this technique by using painter's rags and masking tape to eliminate the mess of working with wet plaster. He finished the mountain contours with joint compound, then painted the surface and added static grass.

BUILDING MOUNTAINS

After several weeks of running trains, I switched gears and built the mountain scenery on the peninsula in the north room. I started with the landforms in the center of the peninsula, using paper towels soaked in plaster over a web of cardboard strips. Once the plaster set, I covered it with a couple of coats of joint compound. Although I'd placed drop cloths to protect the floor and the backdrops, working with wet plaster still proved to be the messiest part of building the railroad.

I knew there had to be a better way – and there was! I found I could attach painter's rags to the cardboard web and then cover them with joint compound. I further revised the technique by simply covering the cardboard with masking tape instead of rags. Once I eliminated the wet, plaster-soaked towels and most of the mess, scenery work became fun.

I painted the landforms with tan latex paint and added various shades of Woodlands Scenics static grass, trees, and other vegetation. I did my best to match the color of the landscape on my photo backdrops.

There are also dense patches of forest in certain locations, such as the area around Caliente. Using only individual tree models proved too expensive for me. Instead, I modeled these areas with poly fiber clumps attached to cardboard strips. The added height matches the foreground tree models and makes the finished scene look more realistic.

Scenery isn't complete without a fascia, and I made mine from ⅛" tempered hardboard with the top cut to match the contours of the landscape. Along much of the main line I glued the cardboard web for the scenery base to the inside of the fascia. When the scenery was finished, I painted the fascia black. It's amazing how that simple step makes the scenery stand out.

OAKVILLE YARD

I built Oakville Yard while I was still working on the scenery in the north room. Like the staging yard, Oakville Yard is built on a ¾" plywood tabletop. The track is Micro Engineering code 55 flextrack on simulated wood ties. The UP uses wood ties for its yard track, so the track in my Oakville Yard looks prototypical. I used Atlas code 55 no. 7 turnouts for the yard ladder.

The turnouts are operated with switch motors. I built two separate fascia-mounted control panels for Oakville: one for the yard throat and another for the ladder.

RUNNING IN 13 MONTHS

Finally the day came when I drove the golden spike and finished the trackwork. All the scenery in the north room was complete. I turned my attention back to the south room and scenicked the layout above the staging yard. The scenery was finished in April 2009.

I have a lot of fun running and watching long trains led by m.u.'d diesels along the scenicked main line. Freight traffic includes intermodal, merchandise, and auto rack trains. One of the longest trains I run is the BNSF Ry. "earthworm" that consists of 74 covered hoppers. Amtrak passenger trains also make an occasional appearance.

It took me 13 months to get the layout up and running, but I'm not done yet. I still have a lot of trackside structures and other details to add. I plan to spend the rest of my life running trains and working on the Oakville Sub. HTMTR

Now on ModelRailroader.com

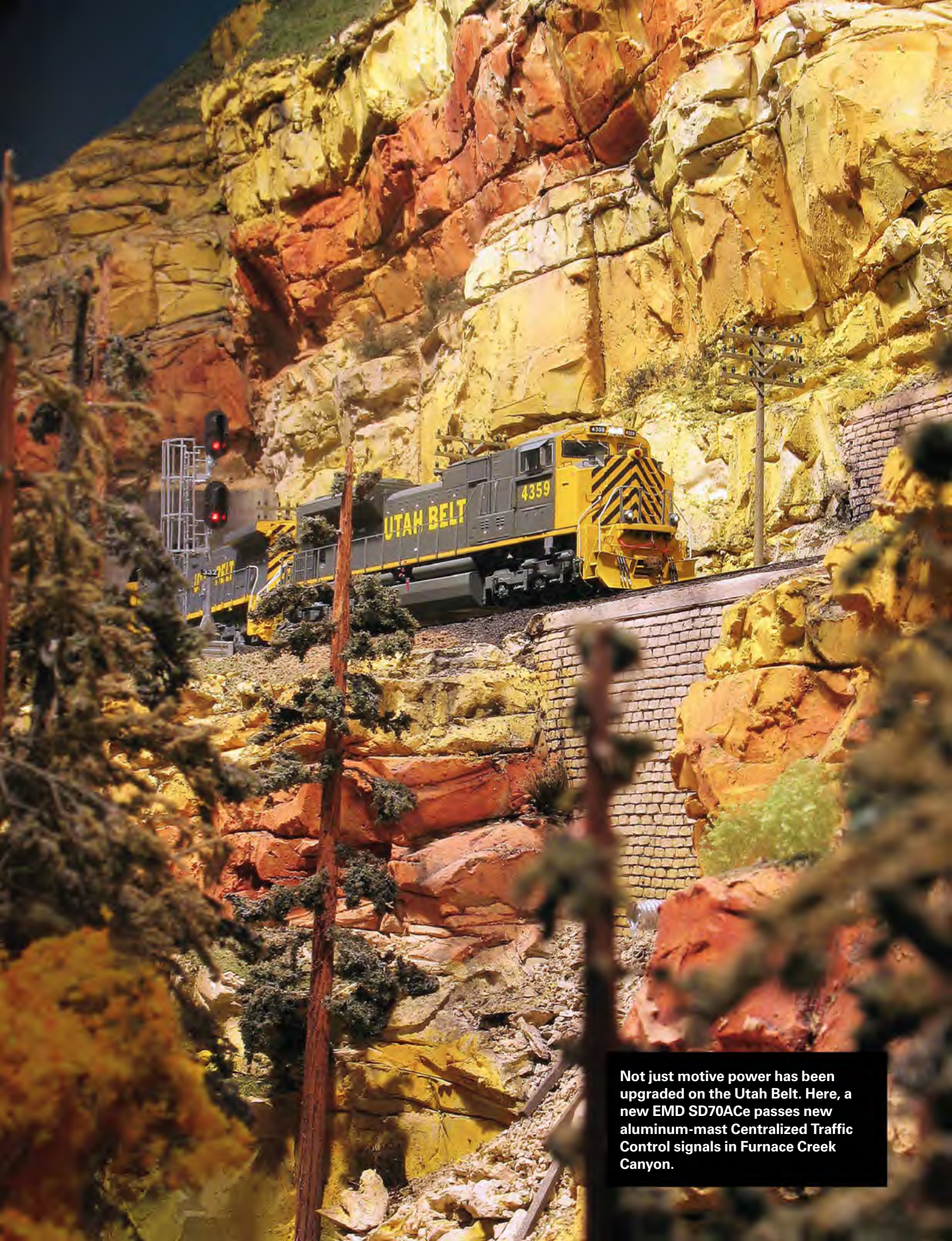
Jim shares additional construction photos of the Oakville Sub and a tip for building better background trees on our website. Learn more at **www.ModelRailroader.com.**

SIGNS OF THE TIMES ON THE UTAH BELT

Long a loyal customer of General Motors Electro-Motive Division, the Utah Belt has started branching out to buy from other motive power manufacturers. Here, National Railway Equipment 3GS-21B Genset no. 2100, purchased for its ultra-low emissions, switches industries in Benton, N.M.

Modernizing motive power, signals, and more on an always-current model railroad

BY ERIC BROOMAN
PHOTOS BY THE AUTHOR



Not just motive power has been upgraded on the Utah Belt. Here, a new EMD SD70ACe passes new aluminum-mast Centralized Traffic Control signals in Furnace Creek Canyon.

A less than welcome sign of the times is the appearance of graffiti. This boxcar, itself a rare sight on a road increasingly dominated by intermodal traffic and unit coal drags, also carries a flashing rear-end device (FRED).

THE UTAH BELT has been evolving for more than 30 years. In the early 1970s, Electro-Motive Division F7s, GP9s, and SD9s were still holding their own, along with 40-foot boxcars and cabooses. The '80s brought double-stacks and flashing rear-end devices (FREDs). By the '90s, safety cabs were becoming common. The turn of the century brought General Electric locomotives and alternating-current (AC) propulsion, breaking the EMD and direct-current stronghold on the railroad.

And as the calendar turns to the second decade of the second millennium, the ever-changing scene of modern railroading continues on the Utah Belt.

THE CHANGE TO AC POWER

The UB has always looked for the latest in motive power technology. However, being a smaller Class 1, the road prefers to let larger lines test the newest offerings before investing in multimillion-dollar locomotives. The UB has been pleased with the performance of its General Electric AC engines. Their lower maintenance costs and improved tractive effort have won over management.

The GE AC4400CWs have worked well for the UB, but when new engines were needed in 2010, the motive power department went back to its longtime supplier, EMD, which by this time was no longer a division of General Motors, but a subsidiary of Progress Rail Services Corp. called Electro-Motive Diesel. Its latest offering, the SD70ACe, was receiving excellent reviews from the big Class 1s, and as a result EMD was beginning to regain its position as the premier locomotive builder. The 4,300 horsepower rating, AC drive, ease of maintenance, and shop-force familiarity with EMD products were the determining factors in the decision to purchase the SD70ACe.

Located in the Rio Grande Valley, the town of Benton, N.M., has long had air quality issues. The UB has a major yard and engine terminal there, as well as several rail-served industries in close quarters. City officials asked the railroad to reduce locomotive emissions, especially in the city streets.

After looking into several of the low-emission builders, management decided on National Railway Equipment's 3GS-21B. This super-low-emission engine now prowls the Benton industrial district. With the capability of running on any combination of its three 700 hp Cummins engines, this locomotive is helping improve the town's air quality.

Older power continues to be retired from the roster as major repairs are required. Many of the SD40-2s and SD50s are running out their last miles in helper service out of Benton. The mine turns that operate out of Benton are still the domain of the SD40-2s, with local mixed freights using GP38-2s.

Train crews still praise the SD40-2s for their ride and pulling abilities. These units may be around for a while, undergoing major shopping and rebuilding. The SD50s, however, are notorious fuel guzzlers and will likely be retired when major repair issues arise. Yard switching and transfer duties continue to be held down by MP15DCs.

The Southern San Pedro, a desert short line that interchanges with the UB at Descanso, has also undergone changes. The venerable Alco that served so faithfully has finally been retired, due mainly to scarcity of parts in this remote area. A second-hand EMD SW1000 was purchased from a used equipment dealer. The SSP's unique caboose, which had bay windows as well as a cupola, was donated to the Chamber of Commerce in El Vado, the line's southern terminus.

UPDATING THE ROLLING STOCK

Anyone who's been trackside in the last several years can't help but notice the changes taking place in rolling stock. Unit trains and intermodal are prevalent. Although there are still large numbers of general merchandise trains, these are dominated by covered hoppers and a huge variety of tank cars. The once ubiquitous boxcar is seen less and less often.

Another major change taking place in rolling stock is the decline of equipment owned by the major roads.

The Utah Belt's customers have been modernizing, as well. A Utah Belt train led by SD60M no. 3867 passes the U.S. Carbon mine in Descanso, N.M., where aluminum-bodied coal hoppers are filled under a new flood loader.

Reporting marks representing a wide array of private owners and leasing companies have replaced the familiar railroad initials.

And that's not all. Along with these changes, government-mandated reflective stripes are gradually being applied to all equipment. Locomotives and cars of the 2000s are required to have reflective tape applied to the side every 10 feet to make them more visible at night. New equipment has this applied at the builder, with older equipment being taped as quickly as possible, often in a slap-dash fashion. It may not seem like much, but as anyone who has ever been around a rail yard at night or an unsignaled crossing after dark can testify, the reflective markings can be a real lifesaver.

One less-welcome decoration that has recently appeared on the UB is graffiti. As a testament to our current culture, it's a rare sight to see a freight car that hasn't been defiled. Since the UB is always set in the present, several cars have been so humbled, but not as many as would be required to appear truly prototypical.

RETIREMENTS

The Utah Belt's ancient wood-sided flanger has finally been retired. That steam-era survivor has been replaced with a steel flanger that now helps keep the line open during the winter months. The original outlived what would be its normal useful life because it was used occasionally (some years, not at all) and was replaced only after it became totally unserviceable. Resourceful shop forces built the new flanger, salvaging as much as possible from the old.

Another steam-era icon has likewise been upgraded. Years of exposure to the elements have led to a gradual replacement of all of the roads' Centralized Traffic Control (CTC) signals. The cantilever signal bridges were especially susceptible to the weather. Since the government hasn't required railroads to position signals on the engineer's side of the track (where the track being controlled is obvious) since 1985, the signal bridges have been replaced with two standard mast signals. The UB

Older EMD SD50s are reaching the end of their useful lives on the Utah Belt, relegated mainly to helper service out of Benton, N.M. This pair, pushing a coal drag across Coldwater Creek, will probably be retired soon due to their high fuel consumption.

The Utah Belt is ready for winter with this new steel flanger, cobbled together in the UB's own shops and including some salvaged parts. It replaced the wood-bodied flanger that was one of the last relics of the line's steam days.

chose new all-aluminum masts with a full ladder safety cage and a hooded Type D head. Ease of maintenance and visibility were determining factors.

Structures have also changed with the times. All remaining wooden buildings owned by the railroad have been replaced by prefabricated metal structures. The one exception is the depot at Benton. The 100-year-old example of classic railroad architecture was sold to the city of Benton at a nominal cost and was restored. It now houses the Benton Historical Society's rail history museum.

Other buildings have been updated, abandoned, or replaced by more modern businesses. A noticeable change has taken place at the two U.S. Carbon mines in the area. Increased demand for western coal has led the company to expand and modernize its facilities. Large storage silos and more efficient loaders have changed the appearance of the two mines considerably.

MORE CHANGE TO COME

Railroading will continue to change in the years to come, meeting the demand for more efficient ways to deliver the materials the nation requires for a strong economy. The Utah Belt remains committed to meet that challenge. HTMTR

SECTION 2

LOCOMOTIVES

A few details and some simple weathering can turn a basic, out-of-the-box locomotive model into a unique, realistic showpiece like this HO scale Athearn SW1000. Bill Zuback photo

Turning the 'actors' on your layout's stage into stars easier than you think

BY STEVEN OTTE

IT'S BEEN SAID that a model railroad is like a stage, and the locomotives are the actors. If that analogy holds up, then putting a stock, out-of-the-box locomotive model onto the rails without any weathering or detailing is like sending actors out to play Shakespeare in their street clothes. To be believable in the role, our actors must look the part.

There's more to customizing our locomotives than just making them look good. For many, detailing and weathering an engine to model how a particular prototype looked at a particular time is a mini-hobby in itself. You might think of these superdetailed locomotives as "method actors" who really get into their roles.

This is especially true for those hobbyists whose layouts model a prototype railroad at a specific time, sometimes down to the day. For them, researching the prototype until they find that one picture of the fireman's side of a certain engine is as gratifying as the modeling itself.

But you don't have to be a prototype fanatic to benefit from customizing your locomotives, as M.R. Snell demonstrates in the article on page 28. Replacing molded-on details like grab irons and lift rings with wire ones and adding items such as m.u. hoses, ditch lights, and antennas can let an economy-line model stand proudly alongside top-end ones.

Speaking of antennas, in the next article, Cody Grivno uses an etched-brass antenna stand and a few other parts to easily turn an Electro-Motive Division SW1000 into the modern remote-control switcher pictured above. This is a case in which details not only make an engine look more realistic, but also visually define its role. Check out Cody's project on page 32.

Finally, locomotives purchased from other railroads or acquired in mergers can wear their old line's livery for years before being scheduled for a full repaint. On page 34, Kim Nipkow shows how to model a common sight on today's rails – a patched-out locomotive. Such engines have their old herald and reporting marks covered with paint or vinyl decals and replaced with new ones.

With some detail parts, paint, and weathering powders, your locomotives can be ready for the spotlight. HTMTR

Being careful to preserve the factory paint job, Matt Snell added an assortment of small details to enhance the realism of this budget-priced Atlas Trainman HO GP38-2. His model represents a former Conrail unit that currently works for CSX.

HOW TO DETAIL A MODERN LOCOMOTIVE

Applying a handful of small parts will turn an economy model into a showpiece

BY M.R. SNELL • PHOTOS BY THE AUTHOR

ELECTRO-MOTIVE DIVISION'S GP38-2 was the road switcher of choice for North American railroads for more than 30 years. Based on EMD's 1966 model GP38, including the carbody, most of the GP38-2's upgrades are internal. It's popularity led to the construction of 2,213 GP38-2 diesels between 1972 and 1986, and many continue to see daily service in local and yard jobs.

At home on large and small prototype railroads, the four-axle design of the GP38-2 also makes it ideal for model railroads, since the HO scale locomotive can negotiate curves down to 18" radius.

Two manufacturers offer HO scale models of the GP38-2. Athearn makes the early version with "chicken wire" grills and a later model with louvered carbody grills in its Ready-to-Roll line. The firm's

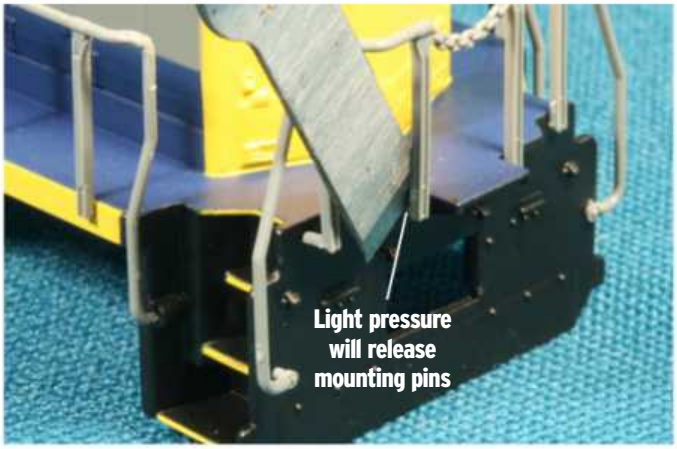


FIG. 1 HANDRAIL REMOVAL. **A no. 17 chisel blade makes it easy to pry off the end handrails to make room for drilling holes and detailing the end of the hood.**

FIG. 2 DRILLING DIMPLES. **Tiny dimples are cast into the shell next to the nut-bolt-washer details to serve as starter points for drilling the holes used to mount the grab irons.**

Genesis line offers models with many variations that match specific prototypes. Atlas has a Trainman GP38-2 which represents a later version constructed with louvered grills, a tapered air filter housing, and a front anticlimber.

I like to keep my Conrail New Jersey Division's locomotive roster up to date, so I elected to add several of the later version GP38-2 locomotives. In particular, I wanted to include one of the units that had been conveyed to CSX during the breakup of Conrail. Thus, my project began with an Atlas Trainman GP38-2 factory-decorated as CSX no. 2790, an ex-Conrail locomotive built in August 1978.

For newcomers, the Atlas Trainman line consists of modestly priced models that look good and run well, but they don't include the hand-applied detailing of their more expensive siblings. Out of the box the locomotive has an excellent painted body shell with well-proportioned plastic handrails, but it has minimal add-on details. I like these diesels since I can easily add the detail items I want in an evening to complete a model that's ready for service.

Any prototype modeling project usually begins with some research. I turned to my personal photo collection and also checked several Internet railroad photo websites, including www.rrpicturearchives.net, www.trainweb.org/csxphotos, and www.rr-fallenflags.org.

By checking the photographs I was able to determine the detail changes that had taken place over the locomotive's lifetime, especially those that happened during its transition from Conrail to CSX. Once I was armed with several quality photos, I was ready to undertake detailing the locomotive.

GRAB IRONS AND LIFT RINGS

Removing the body shell is my first step in any locomotive detailing project. This makes the shell easier to handle, and it allows me to apply cement from the inside of the body to minimize the possibility of marring the factory finish. The Atlas model can be easily disassembled by removing the coupler box retaining screws and coupler boxes. Then it's a matter of lifting the shell off the frame.

Once the shell is free, I remove both the front and rear handrails to provide clear access to install the grab irons. I carefully slip the flat end of a hobby knife with a no. 17 chisel blade between the press-fit stanchions and the floor, as shown in **fig. 1**. By gently turning the blade, I push the stanchion mounting pins out until I can pull the one-piece handrail from its mount.

MATERIALS LIST

Atlas Trainman
906 GP38-2 locomotive, CSX (YN2 scheme) no. 2790
2212 uncoupling levers (AAR Type 1)
6503 caboose curved grab iron

Cal-Scale (Bowser)
528 Detail kit for Trainman GP38-2 (includes brass m.u. hoses, eyebolts, wire grab irons, and uncoupling levers)

Detail Associates
1013 ditch lights (Canadian style)
1508 m.u. hoses
2202 grab irons (drop type)
2206 eyebolts

Details West
155 snowplow (2 required)
236 m.u. cables
274 Sinclair antenna, long
275 Sinclair antenna, short

MV Products
25 headlight lens set (.078")

Floquil paint
110010 Engine Black
110012 Reefer Gray
110031 Reefer Yellow

While the Atlas model doesn't have factory-installed grab irons, it does have nut-bolt-washer details and drill starter points molded in place. See **fig. 2**. I drilled through each location with a no. 80 (.014") bit and installed Detail Associates no. 2202 drop style grab irons. I use a pair of tweezers slipped between the wire part and the shell to ensure the grab irons are spaced evenly. After the grab irons are in place, I applied a drop of CA to each wire leg inside the shell to secure them. Once the CA set, I bent the wire ends over flat against the inside of the body shell to clear the mechanism.

I added grab irons to the rear end of the long hood, as well as the short hood's front, top, and side. See **fig. 3** on page 30.

ROOFTOP DETAILS

Next, I added the rooftop hardware. Atlas uses small bumps to represent lift rings on all of the roof panels, so I removed them with a no. 17 chisel blade, leaving a flat surface to drill into. I marked each hole with a small center punch and then drilled through the locations with a no. 80 bit. Finally, I used a tiny drop of CA to cement a Detail Associates no. 2206 eye bolt in each hole. I deliberately used a minimum of cement to avoid damaging the painted surface around the lift rings in **fig. 4**.

FIG. 3 SHORT HOOD GRAB IRONS. Matt added grab irons on the short hood, including one used as a step for hood-top access from the right side running board.

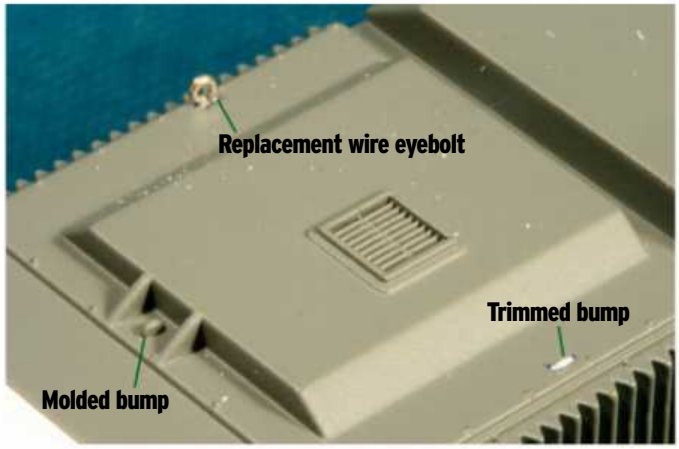


FIG. 4 LIFT RINGS. Atlas simulates all of the lift rings on the roof with raised bumps, which Matt trimmed off. Then he drilled each rooftop location for the wire replacements.

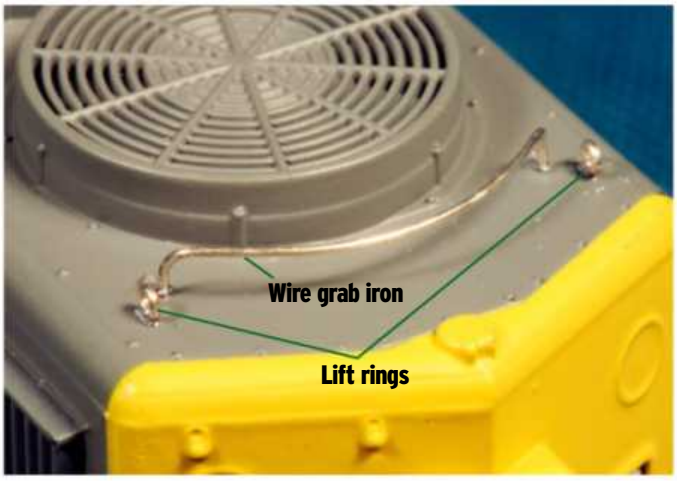


FIG. 5 GRAB IRON. Two holes had to be drilled in the rooftop for the top rear grab iron. At various times Electro-Motive Division applied either a curved or angled grab iron.

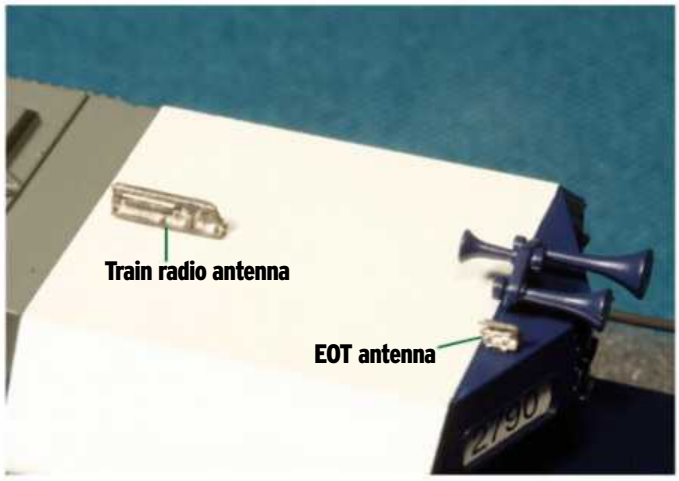


FIG. 6 ANTENNAS. Matt installed a standard Sinclair railroad radio antenna and its smaller end-of-train (EOT) telemetry counterpart on top of the cab roof.

I also added a curved grab iron at the top rear of the long hood, providing a handhold for personnel climbing onto the roof. See **fig. 5**. As before, there's a nut-bolt-washer and dimple cast into each end location. I drilled a hole through each dimple, pressed a Detail Associates no. 6503 curved grab iron into both holes, and secured it with CA applied from the inside.

Various antennas for the train radio and end-of-train (EOT) telemetry are mounted on the cab roof. While antenna styles and locations vary, the standard Conrail application, shown in **fig. 6**, placed a large Sinclair antenna at the rear of the cab roof with a smaller EOT antenna at the front, to the right of the horn.

I drilled the appropriate holes in the roof and added a Details West no. 274 long Sinclair antenna in the rear position and a no. 275 short Sinclair antenna at the front. Rather than painting the antennas in place, I dipped a brush in Floquil Grimy Black, removed most of the paint from the brush, and then drybrushed both of them before installation. [The Testor Corp. has discontinued the Floquil line. –*Ed.*] This technique let the castings' natural silver color represent unpainted antennas with a small accumulation of road grime.

PILOT DETAILS

Both pilots on my model are fitted with the same uncoupling levers, multiple-unit (m.u.) hoses and cables, snowplows, and ditch lights. The ex-Conrail locomotive I was modeling had snowplows at both ends. For uniformity, I trimmed off the factory installed Atlas plow with a no. 17 chisel blade. Then I fitted my model with matching Details West no. 155 plows using the template provided with the castings.

Each plow required me to drill a pair of no. 54 holes into each pilot for the plow mounting pins. I test fit each plow on the model and adjusted them for proper alignment. Then I removed both plows and scribed a small F or R on the bottom of each plow as shown in **fig. 7**. This ensured that each one was installed on the proper end after painting.

Each pilot had four cast pads with dimples for the eye bolts that supported the uncoupling levers. I drilled no. 80 holes through the mounting pads so I could install Detail Associates no. 2212 uncoupling levers I mounted with no. 2206 eyebolts. See **fig. 8**. Once I had the uncoupling levers installed, I used a small screwdriver to bend over each of the eyebolt legs flush against the underside of the pilots. Then I secured each bolt with a drop of CA from behind the pilot.

A set of m.u. cables connect the pneumatic controls so the locomotives can operate together. Metal hose castings are available, but I prefer the individual flexible plastic cables made by Detail Associates because they're easily threaded through the openings in the plows. I drilled a no. 74 hole in each hose location and cemented a Detail Associates no. 1508 m.u. hose

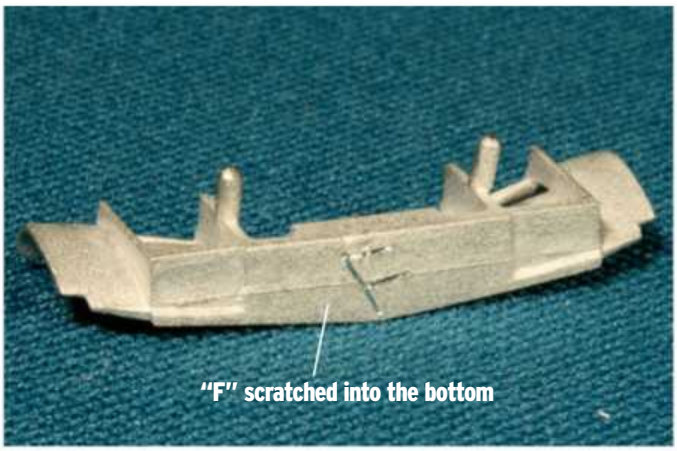


FIG. 7 MARKING PARTS. Matt's locomotive has two snow plows. To avoid confusion after painting the plows, he scribed an "F" or "R" on the bottoms of the metal parts.

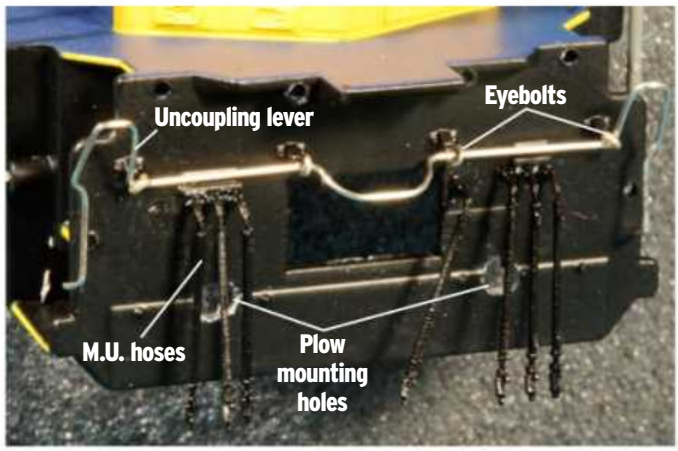


FIG. 8 PILOT DETAILS. Both pilots have matching details including an uncoupling lever and m.u. hoses to control multiple units from a single cab. The plow is a press fit.

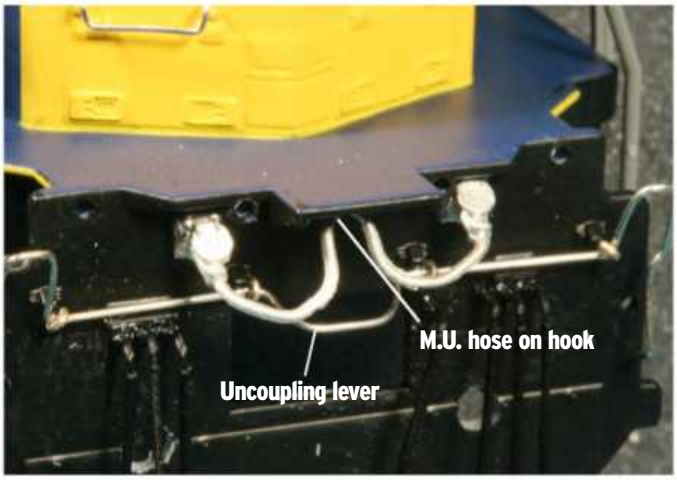


FIG. 9 MORE PILOT DETAILS. This heavy m.u. cable connects the electrical control circuits between multiple locomotives, and is often tethered to the pilot.

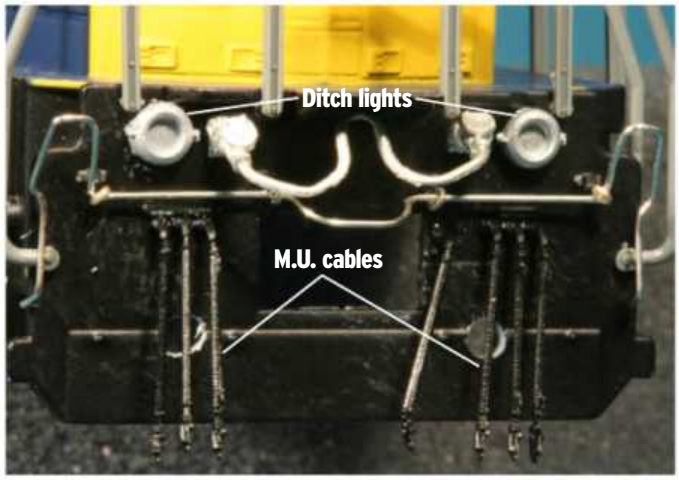


FIG. 10 DITCH LIGHTS. Adding working ditch lights is easy since all the lightweight light-emitting diode (LED) wiring can be hidden behind the pilot and inside the body.

into place as seen in **fig 8**. [A touch of silver paint on the glad hands also enhances the realism of these hoses. –*Ed.*]

A heavy hose makes the necessary electrical connections between the units to control everything else. When this connection isn't in use, it's plugged into a connector on the pilot and the middle of the cable is suspended from a hook below the walkway. Details West part no. 236, shown in **fig. 9**, represents an m.u. hose suspended between two plugs and tethered to the pilot at the center. Adding this cable was an easy task, as I only had to drill a couple of holes and cement the castings into place.

The final details I added were the ditch lights shown in **fig. 10**. Conrail units used in local service had ditch lights at both ends to allow the locomotive to operate either short or long hood forward without restrictions.

Conrail's pilot ditch lights are ideal for modelers who wish to make them operate with light-emitting-diodes (LEDs). I drill a hole through the casting and pilot to insert an LED into each ditch light and run the wires back into the body shell to the unit's circuit board. Use a miniature two-pin plug to disconnect the lights if the body shell is removed.

If a modeler doesn't want working ditch lights, use Detail Associates no. 1013 ditch light castings, paint them silver, and cement them to the pilot. Then add a set of MV Products LS-25 lenses to represent the lights in the castings.

FINISHING TOUCHES

I reassembled the locomotive and then carefully painted the detail parts with colors that matched the locomotive's factory finish. I found Floquil's Reefer Gray, Engine Black, and Reefer Yellow were near perfect matches. A light application of weathering is an easy way to hide any obvious variations.

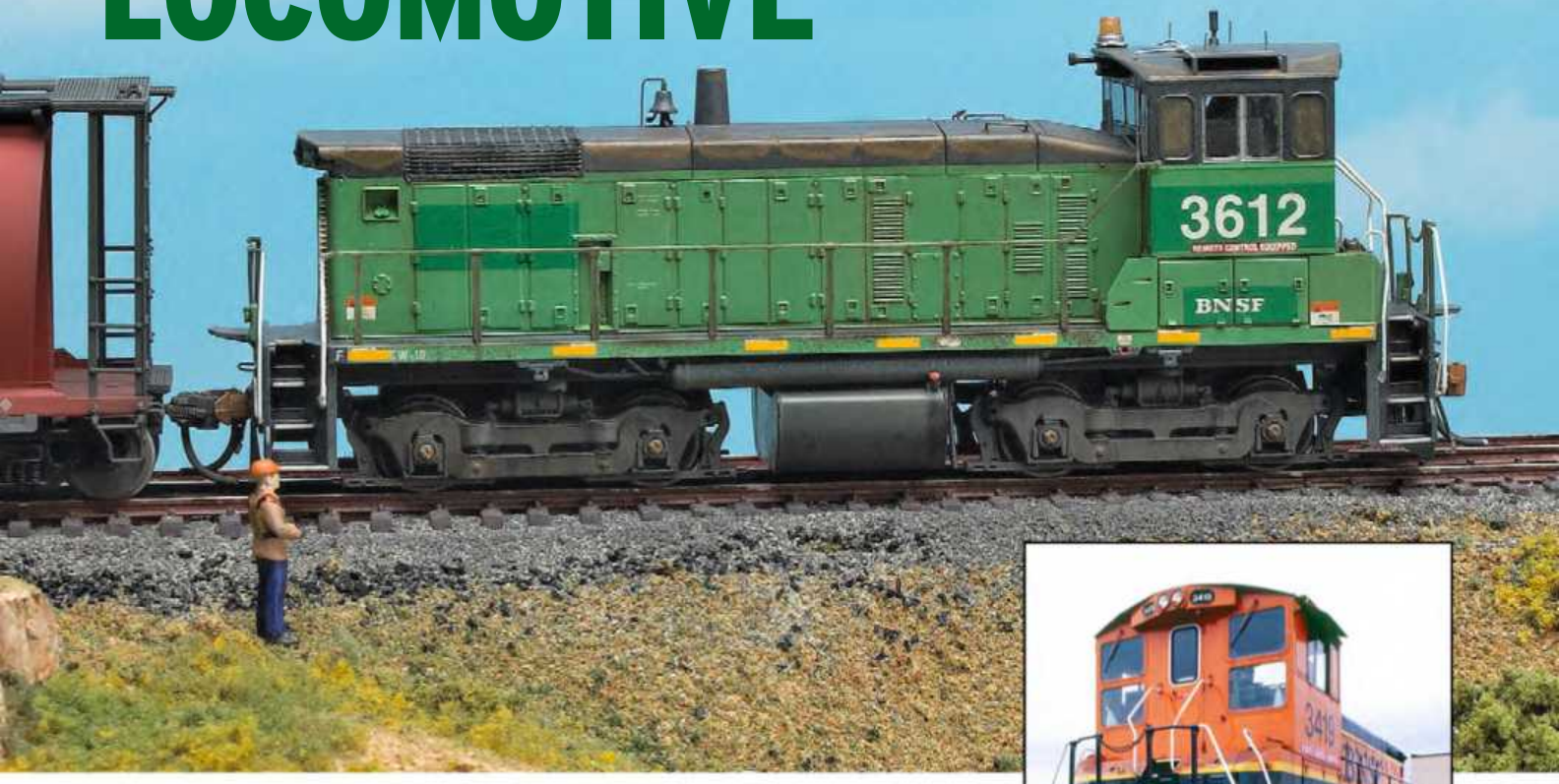
I also painted the vertical corner railings yellow, a safety measure most railroads follow to increase visibility for crews climbing onto the locomotive. The step edges are also highlighted in a similar manner, but in this case Atlas had already done that for me.

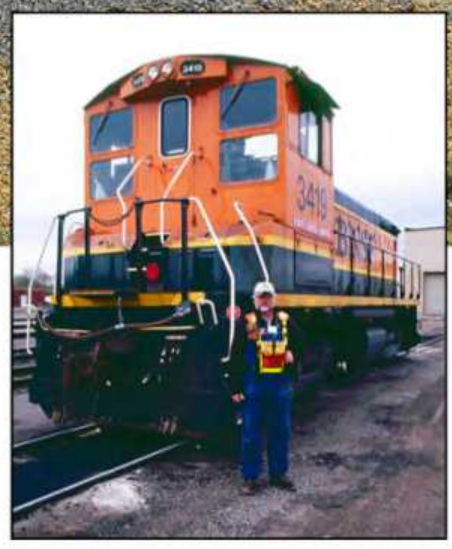
Next, I installed the new snowplows using a drop of CA on each mounting pin to ensure that they didn't loosen up in service on the layout.

My last detailing step was to weather the locomotive with a combination of weathering powders and airbrushing. I gave it a light treatment to represent a locomotive that had recently been painted.

My choice of details produced a model that reflects the typical appearance of CSX GP38-2s that I see regularly. However, the level of detailing anyone else may want to apply is a matter of personal choice. An evening of detailing provides an easy opportunity to customize locomotives. Perhaps best of all, a little effort can also transform a good model into a great model in a matter of hours. HTMTR

DETAIL A REMOTE-CONTROL LOCOMOTIVE





Cody Grivno detailed this Athearn SW1000 to match a modern remote-control switcher. The inset photo shows an operator with his belt pack next to BNSF Ry. SW1500 no. 3419. Model photo by Jim Forbes, prototype photo by Cody Grivno

Modernize yard and road switchers in an evening

BY CODY GRIVNO
PHOTOS BY BILL ZUBACK

I MODEL THE MODERN ERA and am always on the lookout for projects based on the contemporary railroad scene. After I weathered the BNSF SW1000 shown above (see the April 2011 issue of *Model Railroader*), I wanted to take the unit one step further and detail it to match a remote-control locomotive.

Since 2002, remote-control locomotives have been a fixture on Class 1 railroads in the United States, but the technology has been in use longer in Canada and on shortline and industrial railroads in the U.S. As the name suggests, these locomotives are controlled by railroad personnel on the ground using a hand-held operator control unit. This device sends signals to a microprocessor inside the locomotive.

WORKING IN BRASS

I used BLMA Models remote control locomotive antenna stands (no. 4550) as the starting point for this project. The etched-brass kit includes parts for four different stands. I used the large flat-top stand (part A) for the BNSF SW1000.

First, I used a pin vise with a no. 80 bit and the supplied template to drill two holes on each side of the cab. See **fig. 1**.

I then cut the two stands and antenna bases from the fret using a single-edge razor blade, as seen in **fig. 2**. Do this on a hard surface, like a piece of plate glass, so you don't bend the brass.

Next, I carefully filed the edges of the antenna bases and attached one to each stand with medium-viscosity cyanoacrylate adhesive (CA). Make sure the holes in the stand line up with the holes in the base. See **fig. 3**.

I used a pair of smooth-jaw needle nose pliers to remove the long legs from the antenna stand. Just wiggle the legs back and forth a few times until they snap off. **Figure 4** shows how I also used the pliers to bend the short legs at a right angle to the top of the stand.

MATERIALS LIST

BLMA Models
4550 remote-control locomotive antenna stands

Busch
7375 grain field and reeds

Microscale decals
4245 BNSF renumbering patches
4383 BNSF switchers and slugs
87-1035 BNSF renumbered diesels

Polly Scale acrylic paint
414134 Light Undercoat Gray
414140 Tarnished Black
414380 L&N Gray

Smokey Valley RR Products
102 handrail tee

INSTALLATION

I painted the stands Polly Scale Tarnished Black and the antenna bases L&N Gray. [The Polly Scale paint line has been discontinued by the manufacturer, Testor Corp. –*Ed.*] Once the paint had dried, I installed the stands with CA.

Then I bent lengths of .010" brass wire to simulate the conduit that houses the wires running from the microprocessor in the cab to the antennas on the roof. In prototype photos, I noticed there is a tee where the conduit from the cab connects with the conduit between the stands. I used a handrail tee from Smokey Valley Railroad Products (no. 102) to simulate this detail. I carefully brush-painted the conduit and tee with Polly Scale Light Undercoat Gray.

Finally, I cut four ¼" lengths of Busch reed scenery material for the antennas. I secured them in their mounting holes with full-strength white glue.

After the glue had dried, I painted the reed material Flat Aluminum. All of this is shown in **fig. 5**.

DON'T FORGET THE DECALS

My last step was to apply the Remote Control Equipped warning decals. The decals shown in **fig. 5** are from a Microscale set for BNSF switchers and slugs. The style and placement of these warning labels varies, so refer to prototype photos for correct placement.

Detailing a locomotive to match a modern remote-control unit is a simple one-evening project. BLMA Models also offers the antenna stands in N scale, so you can adapt these techniques for your favorite 1:160-proportion model. HTMTR

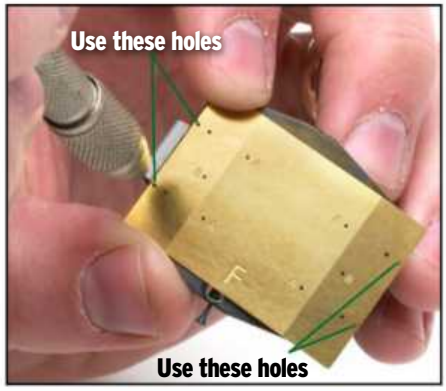


FIG. 1 MOUNTING HOLES. The BLMA Models remote control locomotive antenna kit includes a drilling template for the mounting holes. The "F" indicates the front.

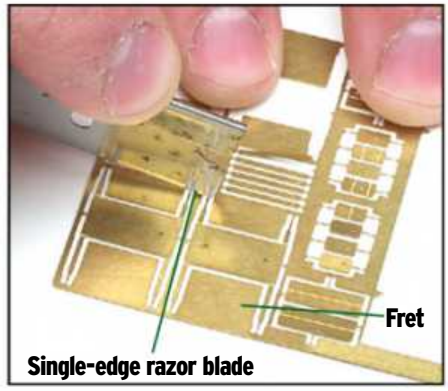


FIG. 2 CUTTING THE PARTS. Cody used a fresh single-edge razor blade to cut the brass parts from the fret. Always cut brass parts on a hard surface, such as plate glass.

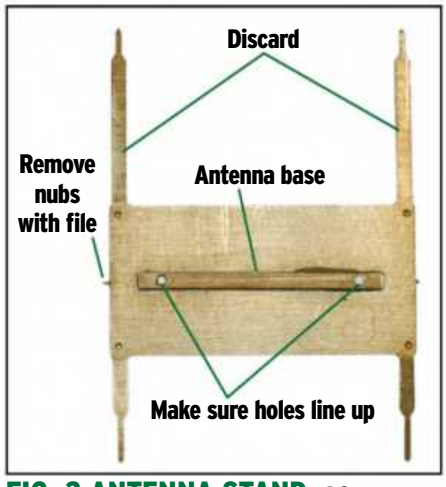


FIG. 3 ANTENNA STAND. After attaching the antenna base with cyanoacrylate adhesive, Cody removed the two long legs from the stand.

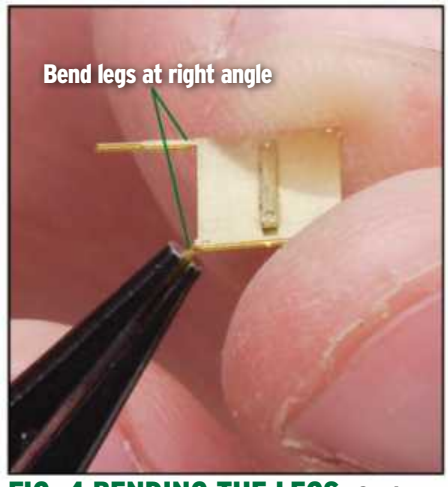


FIG. 4 BENDING THE LEGS. Cody bent the legs with smooth-jaw needle nose pliers. The legs should form a right angle with the top of the stand.

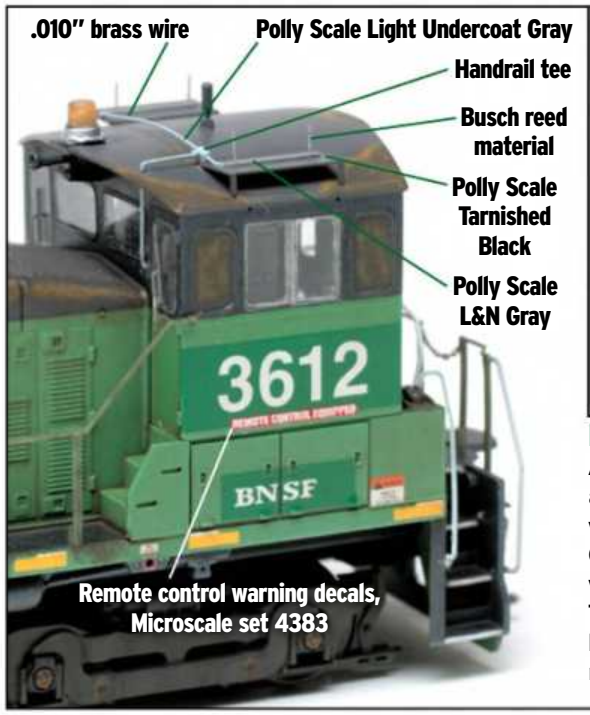


FIG. 5 FINAL DETAILS. After painting the antenna stand and base with Polly Scale paints, Cody installed .010" brass wire to simulate conduit. The antennas are ¼" lengths of Busch reed material.

Though Union Pacific C44-9W no. 6245 has Armour Yellow patches, it still displays the colors of its former owner Southern Pacific. Kim Nipkow shares his techniques for modeling this well-traveled workhorse in HO scale.

HOW TO MODEL A PATCHED-OUT LOCOMOTIVE

Add variety to your fleet with these easy-to-follow techniques

BY KIM NIPKOW
PHOTOS BY THE AUTHOR

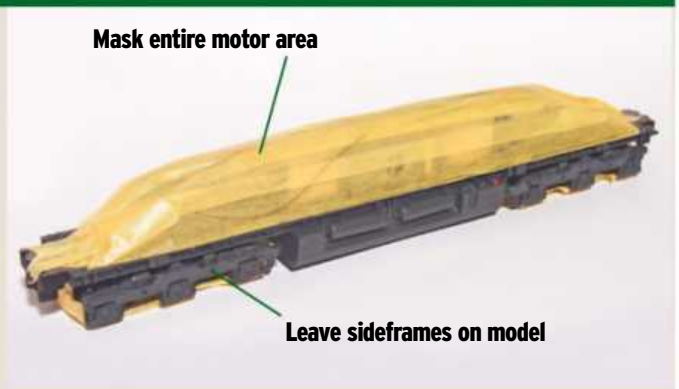
THOUGH UNION PACIFIC and Norfolk Southern made big splashes when they rolled out their heritage units (locomotives painted in the schemes of predecessor railroads), many of today's Class 1 railroads still operate equipment in the colors of former lines. For example, you can still find engines in Southern Pacific and Chicago & North Western paint plying the rails of new owner Union Pacific.

Though some of these units retain their original schemes and numbers, many are patched out to reflect their change in ownership. I'll show you how to do the latter using a Kato HO scale General Electric C44-9W diesel locomotive as my example.

Many of the patched-out SP units are dirty, rusty, and faded. To capture this look, I used a double-action airbrush, acrylic paints, assorted paintbrushes, and powdered pastels (I prefer those by A.I.M. Products). I build up the effects in light layers, as it's much easier to add more weathering than it is to remove it.

Modeling a weather-beaten, patched-out diesel takes time and patience. But in the end, you'll be rewarded with an eye-catching model that will add some color and variety to your locomotive fleet.

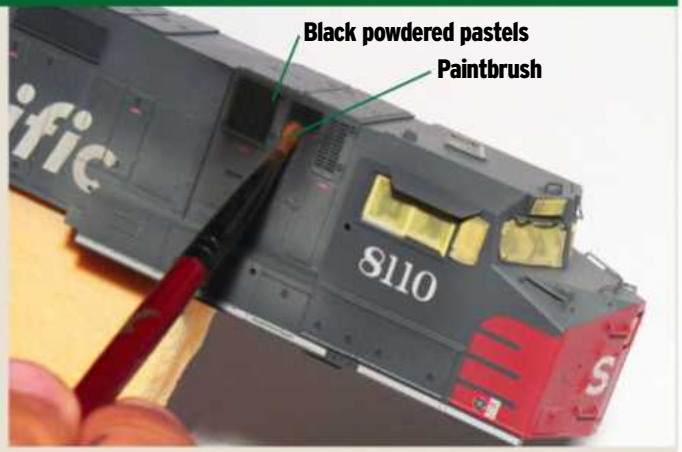
STEP 1 MASKING AND CLEANING



I DISASSEMBLED THE MODEL and masked the windows, headlights, and number boards. Then I carefully cleaned the model with a soft paper tissue to remove skin oils and other impurities that might affect how the pastels and paint would adhere to the model. After that, I only handled the model while wearing gloves.

TO PROTECT THE LOCOMOTIVE'S electrical components, I masked the gear towers on the trucks, the motor, and the light board. I also removed the wheelsets and masked behind the sideframes. I left the sideframes attached to the model so they could be weathered at the same time as the fuel tank and chassis.

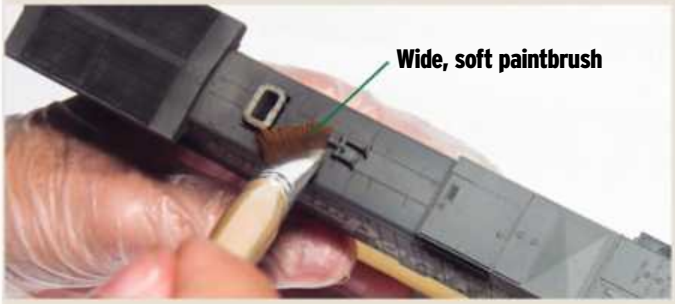
STEP 2 WEATHERING WITH PAINTS AND PASTELS



I NOTICED IN PROTOTYPE photos that the paint on many of the patched-out SP units is badly faded. To re-create that look, I sprayed the model with a mixture of sand-colored acrylic paint and clear flat. For best results, the paint should be thinned to the consistency of a wash. The flat surface gives the model some tooth for the powdered pastels to stick to.

AFTER THE PAINT dried thoroughly, I used a paintbrush to apply black powdered pastels to the grills and screens. This is a simple technique that adds depth to these areas.

Then I used a clean, dry, soft-bristled paintbrush to pull any loose pigments in the grills and screens down the side of the hood. This subtle effect simulates the look of rain-streaked grime found on full-size locomotives.

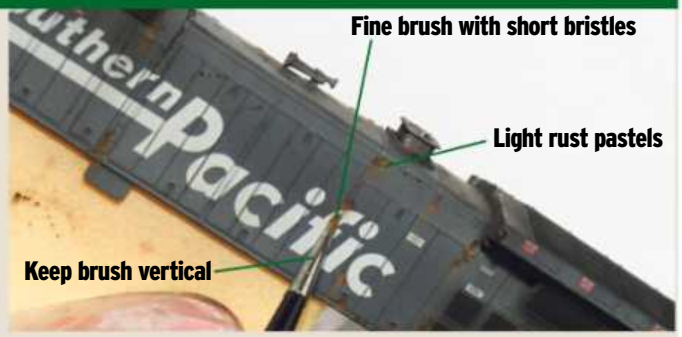


THE BLACK PASTELS also work well for simulating soot and grime around the exhaust stack. First, I applied the pastels on and around the stack itself. Then I used a wide, soft paintbrush to add grime to the roof. The soot should be heaviest near the stack and get progressively lighter.

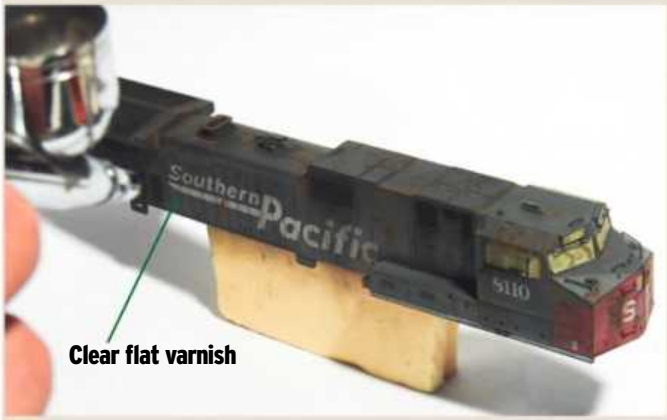
I USED THE SAME WIDE BRUSH from before to pull the black pastels down the sides of the hood. Drag the brush in a vertical motion, keeping it parallel to the doors. Use a scrap piece of foam or wood as a handle to hold the shell while brushing the pastels.

STEP 2 WEATHERING WITH PAINT AND PASTELS (CONT'D)

THE FULL-SIZE SP UNITS have neat-looking rust patches that just beg to be modeled. I captured this look by mixing dark rust pastels in a clear flat varnish. I applied the mixture with a fine paintbrush.



AFTER THE VARNISH and pastel mixture dried, I applied a lighter shade of rust to the patches and pulled the brush down. This simulates the look of rust being washed down the side of the locomotive.



ONCE I WAS SATISFIED with the weathering, I sprayed the model with a clear flat varnish. This seals the airbrush and pastel weathering; protects the model from regular handling; and gives the locomotive a uniform, flat finish.

STEP 3 YELLOW PATCHES

THE ARMOUR YELLOW patches add a splash of color to the otherwise faded SP paint. First, I masked around the original road number on the cab sides and the back of the hood, the SP lettering on the nose, and a battery box door on the engineer's side. Then I sprayed these areas with silver. The base color makes it easier for the yellow to cover in fewer coats. White would also work.

STEP 3 YELLOW PATCHES (CONT'D)

ONCE THE SILVER had dried, I applied the Armour Yellow paint. I was careful to build up the color in light layers to avoid paint ridges along the masking tape and prevent the paint from bleeding under it. If you're using a flat yellow paint, be sure to overcoat it with a clear gloss in preparation for decaling.

STEP 4 DECALING

AFTER A FEW HOURS, I carefully removed the masking tape and re-assembled the model. Then I used Microscale decals set no. 87-523 for the road numbers on the sides of the cab and number boards and the UP shields on the front and back.

First, I soaked the decals in water to release them from the carrier sheet. Then I used a paintbrush and Micro Set to move the decals into their final location. Once I was happy with the position of the decals, I applied Micro Sol. This softens the decals and helps them wrap around any irregular surfaces. HTMTR

ADD WINDOW TINTING TO YOUR LOCOMOTIVES

The level of detail included on many ready-to-run locomotive models, such as this HO scale Athearn Dash 9-44CW, is impressive. To further improve the model, Erik Bergstrom adds window tinting to hide wires routing through the cab.

A quick technique to improve the appearance of ready-to-run locomotives

BY ERIK BERGSTROM
PHOTOS BY THE AUTHOR

IT'S MUCH EASIER for hobbyists today to find highly detailed locomotives and rolling stock at a modest price than in decades past. My recent acquisition of a ready-to-run diesel locomotive got me thinking about how much time I used to spend installing details. Grab irons and other parts I used to add myself are now factory-installed on many models.

I'm pleased with the level of detail on my new HO scale (1:87.1) Athearn Ready-to-Roll Dash 9-44CW locomotive, but I did observe one missing feature – the locomotive's side windows aren't tinted. Tinted windows on a contemporary model not only give the locomotive a prototypical appearance, they also hide visible headlight wires.

I began considering ways to remedy this omission. I could remove the window inserts from the cab's interior and paint the inside of the clear plastic with black paint, preferably with an airbrush to achieve a smooth, consistent finish. By applying paint to the inside of the windows, they retain their reflective quality on the outside. However, this would require removing the windows from the cab for painting.

Instead, I decided to use a real-world solution to resolve my model dilemma. Window tint film might be meant for use on automobiles, but there's no reason why it couldn't be used on model locomotives. Tint film is easy to work with and is available at most automotive parts stores in rolls measuring 24" wide by 6½ feet long. This lifetime supply of locomotive window tint film sells for little more than $10.

On the opposite page, I describe the quick process I use to add the film to the inside of locomotive windows – all without having to remove the windows from the cab.

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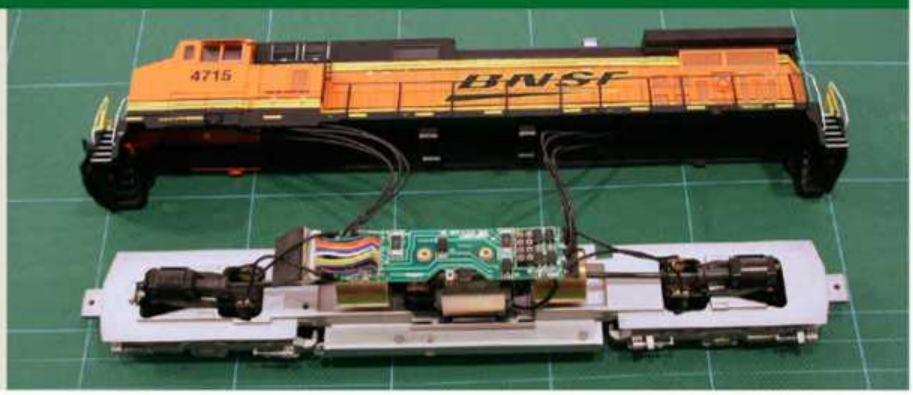
Want more on weathering? Download a free Information Station article by registering your e-mail address at **www.ModelRailroader.com/rapid/2015/04/weathering-tips.**

REMOVE THE SHELL

BEGIN BY PREPARING a smooth work surface clear of any debris that might mar your locomotive. Carefully place the locomotive upside down on the workspace and remove the couplers and any other screws as necessary. Turn the locomotive right side up and slowly lift the shell off the chassis. Be careful if your locomotive has wires running from the circuit board to the headlights attached to the shell.



MEASURE AND CUT WINDOW TINTING

WITH THE INTERIOR of the shell exposed, use a small rule to measure the width of the side windows. The three windows on one side of my model have a combined width of ⅞". Since the tint film can extend above and below the window openings, I cut my piece of film ⅞" wide and between ¾" and 1" deep using a hobby knife with a fresh blade and a straightedge.

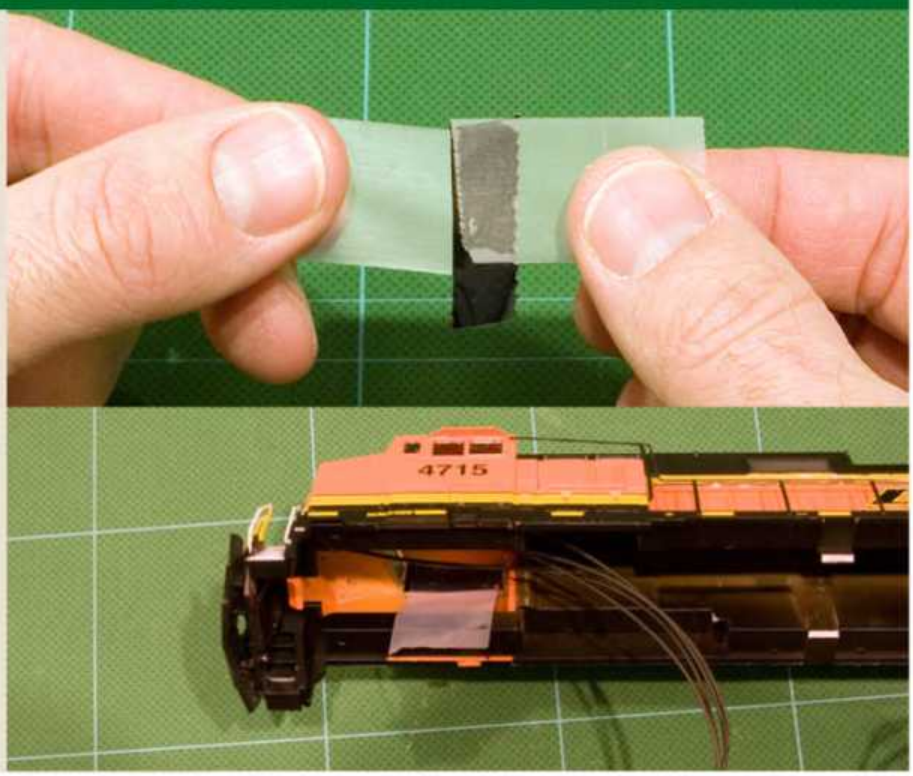
INSTALL THE WINDOW TINT

TO INSTALL THE TINT FILM to the inside of the windows, you must separate the film from the liner that covers the self-adhesive side. First, apply a piece of transparent cellophane tape to each side of the film, with one extending from the left side and the other extending from the right. Gently pull the two pieces of tape in opposite directions and the film will separate from the liner.

Keep the tape attached to the film and use it to help position the film on the inside of the cab window. Once you're satisfied with the position, use a cotton swab to lightly press the film in place over the cab windows.

Once the film is in place, remove the cellophane tape from the back of the film.

Repeat these steps for the opposite side and ⅛" wide rear-facing windows, then reattach the shell to the chassis. HTMTR



SECTION 3

FREIGHT CARS

Pelle Søeborg's easy 10-step technique turned this once factory-fresh HO scale boxcar into a piece of rolling stock with personality and a story to tell. Pelle Søeborg photo

Weathering, details, decals, graffiti turn out-of-the-box cars into standouts

BY STEVEN OTTE

NOTHING ON A RAILROAD stays clean for long. Even freshly outshopped cars quickly pick up a coat of road dust and grime. Paint fades, oxidizes, and peels. Tank cars and hoppers show the marks of their lading. Graffiti "artists" do their work. And always, eventually, every car succumbs to rust.

Modeling these effects of time and wear can make our layouts look less like models and more like the real thing. A shiny plastic boxcar looks like a toy; the boxcar pictured above, after being weathered by *Model Railroader* contributing editor Pelle Søeborg, looks like it's carried many a cargo over many a mile of rough railroad. When placed in a carefully scenicked setting, the weathered car just looks right.

There's an art to weathering freight cars, but you don't have to be an artist to do it. Pelle's techniques, described starting on page 35, call for water-soluble paints, an airbrush, weathering powders, and clear varnish – materials you can pick up at any hobby store. And the techniques are likewise easy to pick up.

Once you've mastered weathering, it's time to move on to the next layer of realism. It's rare these days to see a freight car that doesn't bear the marks of graffiti. Matt Snell's method requires only paint markers, masking tape, and an airbrush.

Cody Grivno's method for relettering a freight car for a different road is even simpler, not even requiring paint. The secret is decal-setting solution, which will also soften some factory-printed lettering without damaging the car's paint job.

But the basis for any good modeling job is knowledge of the prototype. So to start off, Matt tells you what those hazardous materials placards on tank cars and intermodal containers mean. Read on, and soon, your freight cars will look like the real thing. HTMTR

Adding hazardous material placards to a tank car can increase the realism of your freight car fleet, but only if you first understand the significance of each marking. Jeff Wilson photo

A MODELER'S GUIDE TO HAZARDOUS MATERIAL MARKINGS

Add prototype "hazmat" placards to your modern freight cars

BY M.R. SNELL • PHOTOS BY THE AUTHOR

NORTH AMERICAN RAILROADS are some of the largest haulers of hazardous material, commonly called hazmat. If you're watching a freight train roll by, and you know what to look for, you'll likely observe the United States Department of Transportation (USDOT) mandated (since 1990) markings applied to all types of tank cars, covered hoppers, and intermodal equipment hauling hazardous material.

Recently, model train manufacturers have begun to include authentic hazmat markings on factory-decorated modern freight cars. But many modelers also want to add the appropriate markings to their existing fleet. To do so, you'll need to have a cursory understanding of hazmat regulations.

HAZMAT REGULATIONS

To accurately model hazmat markings, you'll first need to understand how hazardous substances fall under one of the nine hazard classifications listed in **fig. 1**. Additionally, the USDOT requires that all hazardous substances must be grouped into divisions. For example, the compressed gas class includes two divisions, flammable and non-flammable gases.

In addition to maintaining a classification and division, each hazardous substance also receives a four-digit number, ranging from 0001 to 3500. This is called a UN number, and it is assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods. The number is specific to each

FIG. 1 HAZMAT CLASSES

CLASS 1 Explosives
CLASS 2 Compressed gases
CLASS 3 Flammable liquids
CLASS 4 Flammable solids
CLASS 5 Oxidizers
CLASS 6 Poisons
CLASS 7 Radioactive materials
CLASS 8 Corrosive liquids
CLASS 9 Miscellaneous

The United States Department of Transportation (USDOT) categorizes hazardous substances transported by rail into nine different classifications.

FIG. 2 PLACARD PLACEMENT. Placards must be displayed on all four sides of both road and railroad equipment in such a way that first responders can quickly identify the hazardous contents.

FIG. 3 SPECIAL RULES. When transporting more than one class of hazardous material, at least one of which is over a certain weight or in bulk packaging, truck trailers can be required to display an interesting array of placards.

substance. Examples of UN numbers used on tank cars includes nos. 1075 for liquefied petroleum gas/propane, 1170 for ethanol, 1203 for gasoline, and 1993 for diesel fuel/fuel oil. You can view a comprehensive table of UN numbers online at www.environmentalchemistry.com.

HAZMAT MARKINGS

Both the class and UN number appear on hazmat placards applied to both road and railroad equipment. A placard is a 12" x 12" diamond. As shown in **fig. 2**, placard colors, graphics, and lettering all relate to one of the nine classes and divisions of hazardous materials. Transportation regulations state that all vehicles carrying hazardous materials in excess of certain weights must have the appropriate placard applied to all four sides of the equipment.

Sounds simple so far, right? A tank car full of gasoline would receive a placard suitable for gasoline. However, the subject can get complicated, as special regulations apply to equipment carrying multiple substances and sometimes only one substance.

Intermodal containers and trailers are examples of equipment that can readily carry multiple substances. In cases like these, special requirements are based on the weight of each substance as well as the combined weight of all the hazardous substances transported in a train.

Based on USDOT regulations, roadway equipment can display a DANGEROUS placard in place of the individual class placards when the weight of an individual substance does not exceed 2,205 pounds. If one substance exceeds that weight, it must have its own placard along with the DANGEROUS placard. This application can be seen in **fig. 3**.

As most railroad cars carry only one substance, they're considered to be carrying in bulk. Bulk packaging has its own unique rules, applicable to any equipment hauling only one

FIGS. 4 AND 5 BULK PLACARD. **The bulk placard (left) displays the unique UN number in the center. A variation of the bulk placard is to use a standard placard with a separate orange panel (right) displaying the UN number.**

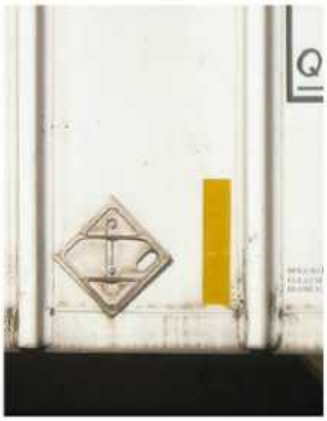


FIG. 6 PLACARDS FOR COVERED HOPPERS. **Though not as common as on tank cars, placard frames are sometimes also found as standard equipment on covered hoppers that can carry hazardous loads.**

FIG. 7 CONTAINER AND TRAILER PLACARDS. **Nearly all rubber-wheeled equipment, including box trailers, feature metal placard frames, hinged flip-style placards, or a combination of both.**

FIG. 8 SELF-ADHESIVE PLACARDS. **Where equipment has no placard mounting hardware, such as a container, loads display a self-adhesive placard affixed in the same locations you would expect to find a placard frame.**

FIG. 9 NON-STANDARD PLACEMENT. **The standard application for a placard is along the lower half of the equipment. Containers often have placards placed high on the sides where they can't be obstructed by the sides of well cars.**

substance or equipment carrying a substance in specialized packaging, such as portable tanks or containers.

This application requires a placard displaying the UN number in place of the class name or the standard placard used in conjunction with an orange panel displaying the UN number in black. See **figs. 4** and **5** above. These are the most common applications used in model railroading, as most freight cars are considered bulk packaging.

MODELING HAZMAT MARKINGS

Placards are simple details you can easily add to improve the accuracy of freight cars made in all sizes and scales. Almost all tank cars, many covered hoppers, and some intermodal equipment have placard holders or frames built into the car. A placard frame is just that – an open metal frame designed to hold a paper placard.

As previously shown in **fig. 2** on page 29, tank cars generally have placard frames mounted on a stem welded to the end framework of the right side of the car in addition to each end. The placard frame is commonly included as a model kit part, but these can also be added using Detail Associates part no. 6237 or Plano Model Products part no. 310 for HO scale cars, along with JnJ Trains part no. 4 for N scale cars.

Unlike the stem mounting used on tank cars, the placard frames on covered hoppers are generally mounted directly to the car sides. See **fig. 6**. Because the recessed ends of a covered hopper don't readily accommodate a placard frame, it isn't uncommon to see frames mounted to the upright structural beams of the ends. Another option is to mount the frame along the end crossover platform.

Modern intermodal vehicles such as trailers and some 53-foot containers have placard frames installed on each side and end during construction.

Unlike railroad equipment, rubber-wheeled equipment can have two different styles of placard frames. One version is a standard metal frame for cardboard placards (**fig. 7**) and the second is a hinged assembly containing each of the common placards. In the latter case, a driver can simply flip through the hinged assortment to find the appropriate placard and then secure it using built-in clips. See **fig. 3** on page 29.

You can add the simple open frame to HO scale models using Plano Model Products no. 311 etched-metal placard frames, or add the hinged style to both HO and N scale models using decal sets. Frame placement may vary to accommodate the graphics applied to the equipment. Generally, the frames

are located along the lower edge of the both sides and front end, and mounted to the right side door on the rear of the trailer or container.

In other cases the vehicle, either road or rail, may not be equipped with any apparatus to hold placards. In this situation, the vehicle bears a self-adhesive placard, like that seen in **fig. 8**, typically applied in the same locations you would expect to find a placard frame.

One non-standard placard application is commonly found on containers transported in well cars. As shown in **fig. 9** on the previous page, containers riding in well cars may have the self-adhesive placards mounted high on the sides of the container rather than along the lower edges, so they won't be obscured by the sides of the car.

Whether you're filling placard frames or using the self-adhesive style, almost all variations of common placard requirements can be fulfilled using decal sets available from Microscale Industries. See **fig. 10**. Two sets of placards suitable for both road and railroad equipment are nos. 840 (available in HO and N scales) and 975 (HO scale only).

You will want to add details and realistic weathering effects to the car prior to applying placard decals. Next, apply the water-slide decals to the frames or body using a setting solution that allows the film to conform to uneven frame surfaces, exterior posts, or rivet detail.

On some modern trailer models, you'll find that placard frames are printed directly onto the sides. As shown in **fig. 11**, place the placard decal directly over the printed frame to identify the hazardous disposition of this load.

In other cases a manufacturer may have supplied incomplete markings on a factory-decorated car. In **fig. 12** you see a Walthers tank car decorated with the UN number listed in the orange panel. While this is correct, the car was missing the required Class 9 bulk commodity placard, which I added using a Microscale decal.

RULES FOR HAZMAT LOADS

Adding hazmat markings on model equipment results in a more accurate and visually interesting roster. These markings can also open new possibilities for modeling the load-handling practices in accordance to prototype railroad operating rules and regulations.

Due to the danger of these loads, every railroad applies operating rules to moving hazmat shipments. As evident from the rule book shown in **fig. 13**, many prototype rules are often lengthy and complex. However, there are some rules that can be easily adapted for use in model railroading.

Several rules address the placement of a hazardous car within a train. For example, a loaded hazmat car can't be placed next to an occupied locomotive or caboose. Another rule states that hazmat cars must be placed at the middle of the train, no closer than the sixth car from an occupied engine or caboose, when train length permits. Yet another rule precludes placing a hazmat car next to a loaded flatcar or cars with mechanical refrigeration equipment.

Using these rules will add a challenge for yardmasters when assembling trains, requiring them to plan the placement of any hazardous cars. Applying these same rules in local freight operations will require a crew to place a buffer car between their locomotive and any hazardous cars, often giving them extra switching moves to meet the requirement of the rules. This and many other safety precautions and actions stem from the simple addition of accurately applied hazardous material placards and markings. HTMTR

FIG. 10 PLACARD DECALS. Adding placards to model railroad equipment is as easy as applying the appropriate marking from a commercial decal sheet. Setting solution helps the decal lay over factory-molded placard frames.

FIG. 11 FLIP-STYLE PLACARD. To create a flip-style placard, such as the one on this Athearn trailer, simply center the decal inside the printed placard. This lets a portion of the silver edge show.

FIG. 12 FACTORY-APPLIED MARKINGS. Current model makers will often apply partial markings to modern equipment. You can apply additional markings and data included in various decal sets.

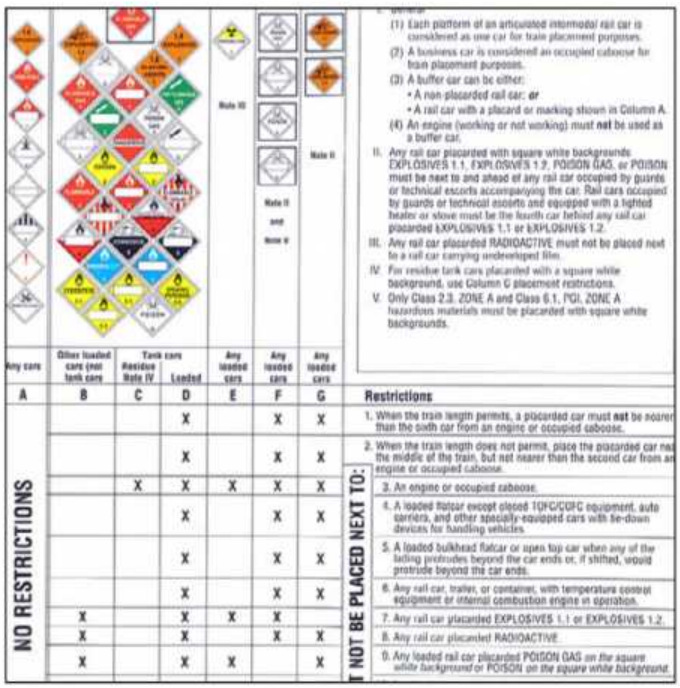


FIG. 13 RULES OF THE RAILROAD. As shown in this excerpt from a railroad rule book, requirements for handling hazmat cars can be rather complex. However, they're easily adapted for a layout of any size or scale.

HOW TO RELETTER A CAR WITHOUT REPAINTING

Solvent and decals let you change a car from a foreign road to one you need

BY CODY GRIVNO
PHOTOS BY JIM FORBES

This HO scale Dakota, Minnesota & Eastern Trinity covered hopper was originally lettered for Coors Brewing Co. (inset photo). Cody Grivno shows you how to change the car's ownership without having to repaint it.

ONE OF THE MORE COMMON questions we get at *Model Railroader* is "Why aren't more cars made for the [fill in your favorite] railroad?" For manufacturers, it's a dollars and cents issue. Naturally, more models are going to be offered decorated for popular roads like the Atchison, Topeka & Santa Fe; Pennsylvania RR; and Union Pacific than for short line and regional carriers. But that doesn't mean you can't have the model you want. In fact, a factory-painted model may be the starting point for your next project.

While railfanning a few years ago, I saw some Dakota, Minnesota & Eastern (DME) Trinity 5,161-cubic-foot-capacity covered hoppers in the road's simplified gray scheme. Though Athearn has offered DME hoppers in yellow, it has never offered gray cars.

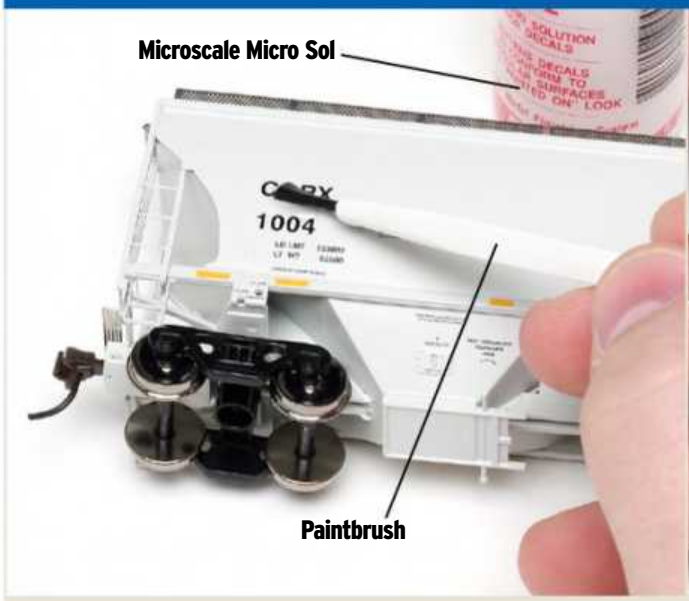
Faced with this situation, I would typically find a model decorated for a different railroad, strip the paint, and repaint it. But the Athearn car, originally a Genesis-series model, has too many delicate details to try this approach.

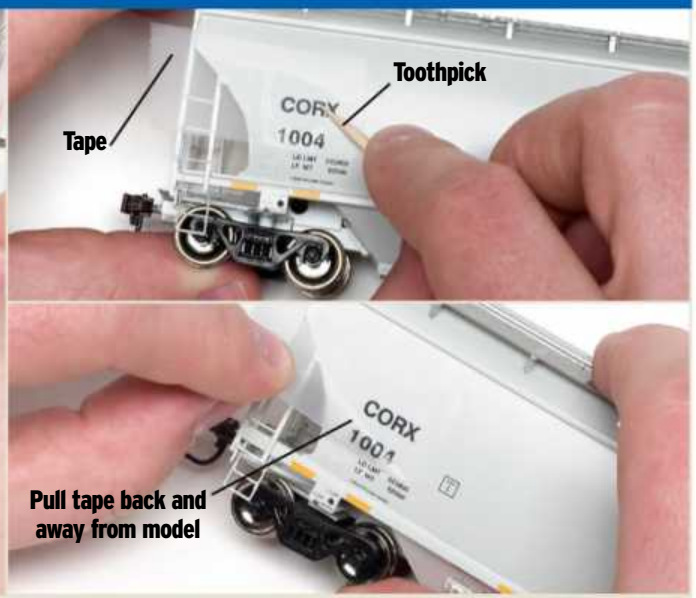
My fortunes changed during a trip to the local hobby shop. There, I found a hopper decorated for Coors Brewing Co. (CORX). The car, shown in the inset photo, was painted gray and had limited graphics. With the exception of the reporting marks, road number, capacity information, and yellow stripes, the markings on the model closely matched the DME car. The car doesn't have the same number of body panels as the prototype, but I can live with that.

With the model in hand, it was a matter of removing the factory-printed graphics that didn't match the prototype. For that, I used Microscale Micro Sol, a toothpick, and clear tape.

When you're searching for a car at the hobby shop, don't let the road name turn you away. It's easier than you might think to remove factory lettering.

STEP 1 REMOVING FACTORY PRINTING





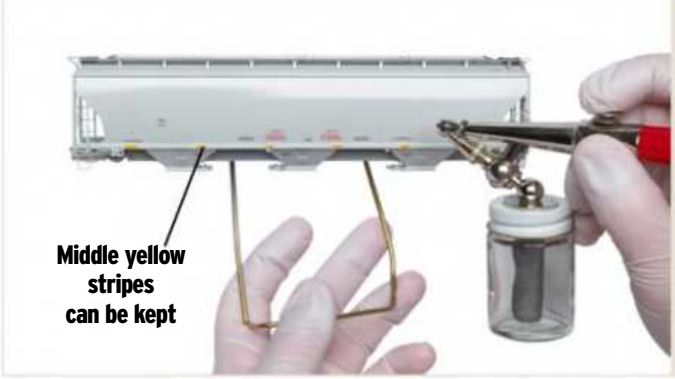
DON'T ASK ME THE SCIENCE behind it, but for some reason Microscale Micro Sol will remove factory printing on Athearn cars (I've tried this technique on cars from other manufacturers with varying degrees of success). This technique works best on cars with black or dark lettering, but I have used it to remove white and bright-colored graphics.

To start, I brushed Micro Sol over the reporting marks, road numbers, load limit and light weight, and yellow stripes. I let the decal setting solution sit for several minutes until it almost (but not completely) evaporates.

With the area slightly damp, but dry enough for tape to adhere, I applied Scotch Magic tape over the graphics. Then I burnished the tape with a toothpick.

I carefully pulled the tape back and away from the model to remove the lettering. If the lettering doesn't peel off on the first attempt, repeat the previous steps until it does.

STEP 2 A CLEAN SLATE



HERE'S HOW THE MODEL LOOKS with the reporting marks, capacity information, and yellow stripes removed (on later cars, I only removed the stripes closest to the jack pads, as shown at left). At this point, I removed the trucks and couplers and carefully washed the model in warm water with dish soap. This removes impurities that may affect paint adhesion.

Next, I sprayed the car with Microscale Micro Gloss. This gives the new decals a smooth surface to adhere to. If you don't apply a gloss coat, the film on the decals may "silver," or fog.

STEP 3 A NEW IDENTITY

I LET THE MICRO GLOSS DRY thoroughly (no discernible odor) before applying the decals. I used Microscale sets 70102 and 90102 (Railroad Gothic black lettering, N and HO scale, respectively), MC-4312 (Minnesota Soybean Processors Trinity covered hoppers), and MC-4380 (BNSF Ry. American Car & Foundry Center Flow covered hoppers) to reletter the car.

I soaked the decals in distilled water to reduce the chances of getting mineral deposits (white spots). I used Micro Set and Micro Sol to apply the decals.

STEP 4 WEATHERING

THE GRAY DME TRINITY covered hoppers are fairly clean, so I applied light weathering. I sprayed the hopper bays with thinned Polly Scale Railroad Tie Brown (1 part paint, 9 parts 70 percent isopropyl alcohol). I then sprayed the car with Microscale Micro Satin.

Next, I turned my attention to the trucks. The trucks, too, are fairly clean. Before painting them, I masked the wheel sockets so the wheelsets would stay free-rolling. Then I sprayed the trucks Polly Scale Steam Power Black with a few drops of Reefer White added.

I brush-painted the bearing caps D&H Avon Blue. I then sprayed the trucks with Microscale Micro Satin.

Next I sprayed the couplers with Lifecolor UA 701 Rust Dark Shadow [Lifecolor paints are available at www.flex-i-file.com – *Ed.*] with an airbrush. Make sure the paint is almost dry when it hits the couplers by increasing the air pressure or holding the airbrush farther away. This prevents the spring from gumming up.

I painted the wheelsets with a Microbrush, keeping the paint off the needlepoint axles and the wheel tread.

Finally, I reassembled the car and added it to my DME fleet. With a few items that are most likely at your workbench, you can easily change the identity of a factory-painted car. HTMTR

Many older freight cars on Pelle Søeborg's contemporary HO scale layout look the part, thanks to the simple techniques he uses to add realistic weathering effects, including faded paint, rust spots, and streaks of dirt and grime.

WEATHER A BOXCAR IN 10 EASY STEPS

Paint and powdered chalk make older freight cars look the worse for wear

BY PELLE K. SØEBORG
PHOTOS BY THE AUTHOR

TRUTH BE TOLD, I have a special affinity for modeling rusty, dusty, and battered-looking freight cars. While not every car on my contemporary HO scale layout shows signs of extensive wear and tear, I do enjoy adding heavy weathering effects to older cars that have plenty of road mileage.

To demonstrate my typical approach, I started with an ExactRail Pacific Car & Foundry (PC&F) Hy-Cube boxcar lettered for BAEX (The Andersons). Straight from the box, the BAEX boxcar has two sets of patches, an indication it had multiple owners during its long span of service.

To make the car appear more like it's been riding the rails for years, I added weathering to the model in just a few simple steps.

First, I used an airbrush to apply several light oversprays of thinned light gray paint. This made the boxcar's paint color appear faded and bleached from prolonged exposure to the sun. Next, I combined rust-colored powdered chalk with clear varnish. Then I used a fine brush to paint that mix on the car in patterns that resemble patches of rust.

For the third step, I added streaks of rust and grime by loading a brush with dry powered chalks and dragging it swiftly down the carbody.

Trucks and wheels also received a touch of weathering. Finally, I made the model resistant to handling by sealing the weathering with a coat of flat varnish, applied with an airbrush.

I suggest only giving a few pieces of rolling stock a heavy dose of weathering, as these cars do attract attention. Follow the photos and instructions on the next pages, and you'll see it's easier than you think to achieve realistic results.

Now on ModelRailroader.com

Model Railroader magazine subscribers can watch video of trains running on Pelle's new layout. Look in the Online Extras box on our website, **www.ModelRailroader.com.**

This ExactRail Hy-Cube boxcar features two different sets of patches, which meant Pelle had to apply weathering to represent three periods of service.

1

I began by using strips of Tamiya masking tape to cover the brown patches surrounding the BAEX lettering. I then masked the older, dark patches with additional tape.

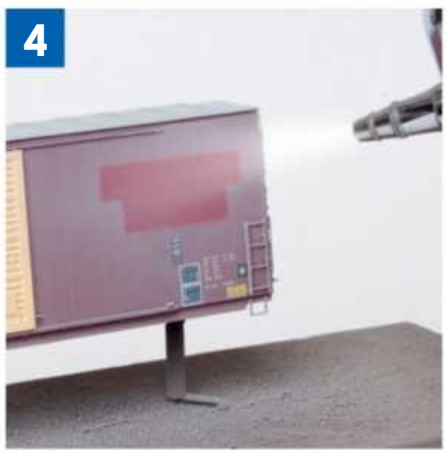
2

To start the weathering, I used an airbrush to spray the carbody with thinned ModelMaster Camouflage Gray (3 parts Testor's airbrush thinner to 1 part paint).

3

After allowing the paint to dry, I then used a hobby knife and tweezers to remove the masking tape covering the older patches only. I intentionally left the masking tape covering the newer patches intact.

4



I applied a few more light sprays of Camouflage Gray with my airbrush to give the older patches a slightly faded appearance. I then allowed the paint to dry thoroughly before beginning the next step.

5

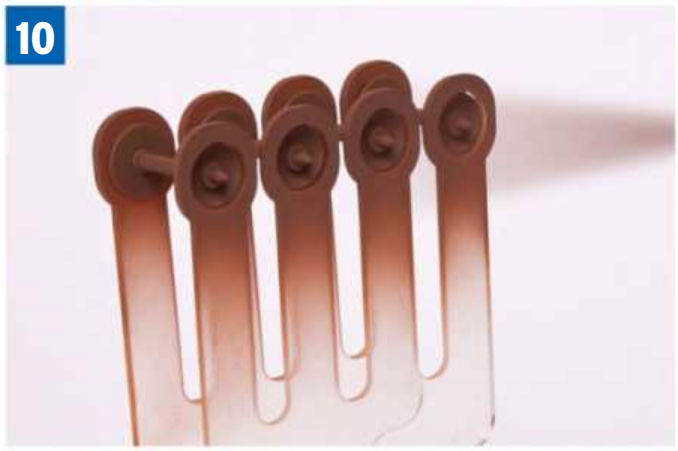
For the next step in weathering, I added rust spots to the car. After mixing Dark Rust weathering powder with Vallejo clear varnish, I used a soft brush to paint rust spots on sides and roof of the boxcar.

I applied streaks of grime caused by rain streaming down the sides. Using a soft brush, I touched each rust spot with Dark Rust and Black weathering powders and then dragged the brush swiftly downward.

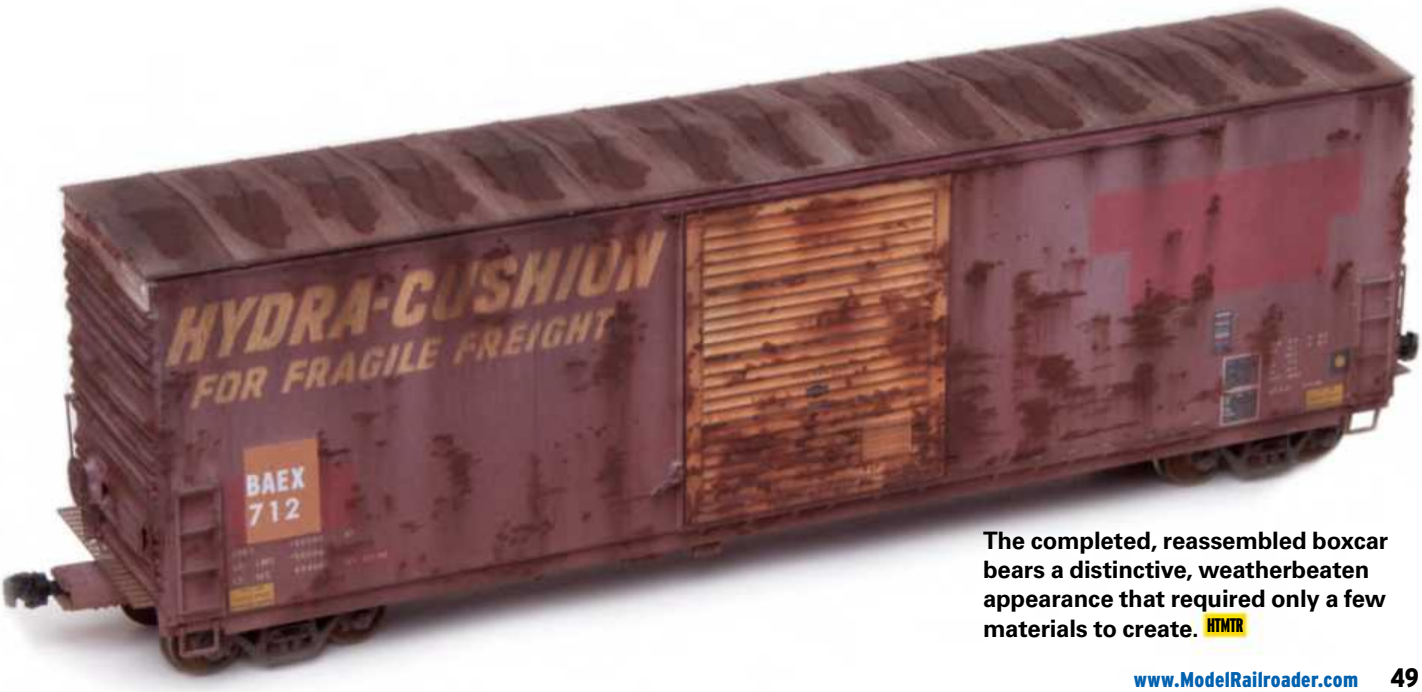
The roof received the same treatment, except I used a wider brush for spreading the dark rust and black powder mix over the rusted areas. In some places, I brushed the loose powder on the roof down the sides.

The weathering is complete, but the paint and powders need to be sealed with a layer of clear varnish. Before applying varnish, I carefully removed the remaining tape used to mask the newer patches.

To weather the trucks, I used an airbrush to apply an equal mix of Vallejo Camouflage Black Brown and Dark Earth paint. Before painting, I also replaced the wheelsets.



I sprayed the wheels a rusty brown. I used a jig from American Model Builders to hold the wheels and cover the treads. Wipe excess paint from the tips of the axles.



The completed, reassembled boxcar bears a distinctive, weatherbeaten appearance that required only a few materials to create. HTMTR

Like it or not, graffiti is part of the modern railroad scene. Matt Snell shares his techniques for adding different styles of graffiti to rolling stock using paint markers and an airbrush.

DO-IT-YOURSELF GRAFFITI

Paint markers and an airbrush make it easy to "tag" your rolling stock

BY M.R. SNELL
PHOTOS BY THE AUTHOR

WHETHER YOU THINK OF IT as an eyesore or art, graffiti is part of the modern railroad scene. Including graffiti, or "tagging," on our model railroads is a personal choice. Those who include graffiti know it can be difficult and expensive using the limited selection of graffiti decals on the market. However, by learning how to draw your own graffiti, you can duplicate what you see trackside. Best of all, it requires limited artistic ability. If you can draw a line, you can draw simple graffiti.

There are several types of graffiti. The first is drawn or spray-painted lettering, as seen in **fig. 1**. This is the easiest type of graffiti to re-create on models.

Balloon lettering is another style of graffiti, shown in **fig. 2** on the next page. This style takes normal letters and turns them into wide outlines, similar to tracing around the edge of a lettering stencil. The letters may be further distorted by bending or stretching them to different sizes, angles, and shapes, leaving each with a fat, balloon-like appearance.

Large block lettering, like that seen in **fig. 3**, is a third style that's easy to reproduce. This style sometimes takes up the entire side of a railcar.

There are dozens of other styles of graffiti. Prototype photos, books, and the Internet are all valuable resources for graffiti ideas and techniques.

ADDING GRAFFITI WITH PAINT MARKERS

Paint markers, sold individually and in sets at art supply and big box stores, are offered in a variety of colors. One consideration when choosing a marker is the tip size, which varies

FIG. 1 BASIC GRAFFITI. Drawn or spray-painted lettering can be easily re-created. This simple graffiti style often contains city names, as seen on this hopper, or nicknames.

FIG. 2 UP, UP, AND AWAY. Balloon lettering is named for the style of the characters. It may be a simple outline or a solid color with a contrasting outline.

FIG. 3 LARGE BLOCK LETTERING. This style of graffiti is generally long and tall. In some cases, the letters may cover the entire side of the car.

FIG. 4 TOOLS OF THE TRADE. Matt uses an assortment of Sharpie paint markers to add graffiti to his models. The markers are offered with different tip sizes, ranging from wide to extra-fine.

from extra fine to wide. See **fig. 4**. The tip sizes can be used to create different effects.

To simulate spray-painted lettering, I used a white marker with an extra-fine tip. First, I used a sharp pencil to write Nervous. . . Beatz on the side of a smooth-side trash car, as shown in **fig. 5**. Then I traced over the pencil with the marker, as seen in **fig. 6** on the next page. To make the graffiti stand out, use a color that contrasts the carbody color.

Paint markers also work well for balloon lettering. I wrote Swag in bright blue letters on the same model. As before, I used a pencil to draw the initial design. A pencil makes it easy to change the shape or size of the letters without committing paint to the model.

Next, I filled in the outline with a blue medium-tip marker. See **fig. 7** on the next page. I let the paint dry completely before tracing the outline of the letters with a white extra-fine-tip marker. Not only does the white outline make the lettering pop, as shown in **fig. 8**, it also hides any rough edges left by the medium-tip marker.

Though blue or red will cover almost any color, what about instances where a light color must be used over a dark background? Light colors can still be used successfully, but they require an extra step. After I draw the pencil outline, I fill it in with white. After the paint dries, I color over it, as shown in **fig. 9** on page 40. Outline the letters with a complementary color to hide any imperfections.

FIG. 5 PENCIL IT IN. Using prototype photos as a guide, Matt uses a sharp pencil to write the letters on the car. If he doesn't like how the letters look, he can simply erase them.

AIRBRUSH GRAFFITI

Though paint markers are handy for adding graffiti to cars with smooth sides, they aren't as effective for auto racks and

FIG. 6 TRACING. Next, Matt traces over the pencil with an extra-fine-tip paint marker. He uses a color that contrasts with the carbody color.

FIG. 7 BLUE BALLOON LETTERING. Matt traced over the pencil outline with a blue medium-tip paint marker. He then filled in the letters to create a solid style.

FIG. 8 POPPING THE BALLOON. To make the balloon lettering "pop," Matt used a white paint marker with an extra-fine tip to outline the letters.

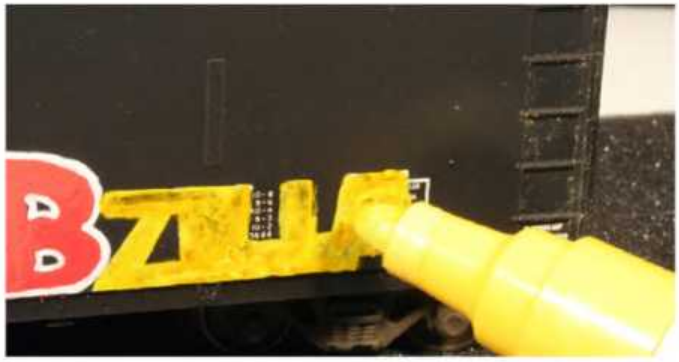


FIG. 9 ON THE LIGHT SIDE. After filling in the pencil outline with a white marker, Matt paints over the base coat with yellow. The undercoat made the yellow cover better.

FIG. 10 PROTOTYPE INSPIRATION. Matt wanted to add the large block-style graffiti seen on this full-size auto rack to an HO scale model. He often uses his own photos, images in books, and photos on the Internet as inspiration.

FIG. 11 A SECOND MASK. After masking the outline of the large block lettering and painting the area white, Matt masked the letters and painted their outlines black. He prefers using blue painter's tape to mask models.

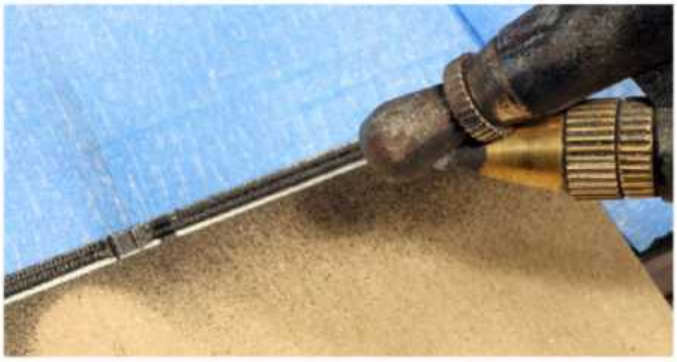


FIG. 12 MOBILE MASK. A few spots on the graffiti needed touching up. Matt used a sheet of cardboard to keep the black paint off the white.

cars with uneven surfaces. In these situations I use an airbrush to ensure even coverage.

I wanted to replicate the graffiti shown on the full-size car in **fig. 10**. To do this, I first masked the side of an HO scale auto rack with blue painter's tape. Then I sprayed the base color, white, with an airbrush. Once the paint dried, I applied a second mask to cover the white body of each letter. Then I sprayed the letter outlines black, as shown in **fig. 11**.

After I removed the masking tape, I noticed that I needed to do some touch-up work along the edges. Instead of masking the car again, I used a cardboard shield, as seen in **fig. 12**.

If you're looking to give modern era rolling stock some realism, try adding graffiti. Whether you use paint markers, an airbrush, or both, these easy techniques will bring your cars into the 21st century. HTMTR

SECTION 4

PASSENGER TRAINS

An Amtrak commuter train rolls past the depot at Mukwonago on the *Model Railroader* staff's HO scale club layout, the Milwaukee, Racine & Troy. Although Class 1 railroads gave up their passenger service more than 40 years ago, intercity and commuter passenger trains still have a place on modern-era layouts. Steven Otte photo

Intercity and commuter service offer many modeling opportunities

BY DANA KAWALA

THE DAYS OF HEAVYWEIGHT PULLMANS and the streamliners of classic fallen flag railroads may be long gone, but that doesn't mean that North American rail travel is dead and buried. For more than 40 years, the National Railroad Passenger Corp., or Amtrak, has been the face of intercity rail service in the United States. Models of Amtrak locomotives and passenger cars are available from several manufacturers in all common modeling scales.

Perhaps even more prominent on today's railroading scene are the various regional and commuter railroads that take travelers back and forth between suburbs and urban centers. Commuter service is nothing new, as you'll see in Patrick C. Dorin's story on page 54. For those modeling the modern era, the short trains, push-pull operations, and variety of equipment offer many modeling and operating opportunities.

Digital Command Control has made running scale model trains more fun than ever, especially when it comes to sound. On page 60, Bob Kingsnorth describes how to use DCC sound decoders to prototypically model the sound of today's modern passenger locomotives. He includes a list of air horns found on Amtrak locomotives as well as a description of head-end power (HEP) and how to model its distinctive sounds.

Today's railroads aren't just about freight. There's still plenty of "varnish" rolling along the rails. HTMTR

MODELING COMMUTER RAIL SERVICE

America's fastest growing passenger trains

BY PATRICK C. DORIN

COMMUTER RAIL SERVICE has become an increasingly important part of North America's urban transportation network. Commuter railroads and agencies operate passenger trains over freight railroad infrastructure to connect cities with their suburbs. These commuter services use full-size locomotives and passenger cars, in contrast to light rail, that uses smaller equipment.

Commuter rail routes serve suburban corridors, extending anywhere from 10 to 100 miles from downtown. Trip times range from 10 minutes to about 2 hours. The Long Island Rail Road covers both ends of this spectrum, with routes ranging from an 8.7-mile trip within New York City to a 96.5-mile run the length of Long Island. California's *Altamont Commuter Express* makes a similar long run, covering 85 miles between San Jose and Stockton. Many other commuter rail routes now extend well beyond the 40-mile mark.

More than 23 commuter services operate in North America with a wide variety of equipment. Many more commuter lines are in the planning stages. It's an interesting and exciting business that offers a lot of modeling potential.

COMMUTER EQUIPMENT

Equipment used in commuter trains has changed substantially since the 1950s. As the photos show, service has been provided with everything from aging heavyweight coaches to the latest 21st century single- and bi-level cars.

Modern commuter lines use either electric or diesel-electric power, some employ multiple-unit equipment (both diesel and electric), and many diesel-powered trains use the push-pull concept. [See "Prototype commuter equipment" on page 59 for a summary of the types of trains in use since the 1950s. – *Ed.*]

Let's take a closer look at the evolution of commuter rail service from steam and early diesel to bi-levels and push-pull operations, and present-day commuter agencies.

STEAM AND EARLY DIESEL ERAS

Most post-World War II commuter service was operated by railroads using

Metra MP36PH-3S no. 417 eases its train up to the platform in Bensenville, Ill., in 2006. New locomotives like this are common on today's commuter railroads. Cody Grivno photo

Amerail bi-level push-pull coach no. 7422 is part of Metra's 7400-7497 series. The 144-seat coaches, built between 1995 and 1998 by the American Passenger Rail Co., feature wheelchair lifts. Cody Grivno photo

A steam locomotive and steel coaches was the norm for commuter service in the first half of the 20th century. Photo by H. W. Pontin, Rail Photo Service

medium-size steam locomotives that were later supplemented with larger engines bumped from long-distance passenger trains by diesels. Within a few years, dual-service road switchers entered commuter service along with E-units, F-units, and other cab diesels.

These locomotive-hauled trains covered their entire suburban district on each trip. A roundhouse with a turntable, or at least a wye, was required to turn locomotives at the suburban end of the district. Most of the passenger car layover tracks were double-ended so the locomotives could be cut off and moved to the servicing area for turning or for an overnight stay. Diesel road-switchers could run around their consists between trips, reducing the need for turning and overnight storage.

The commuter train consists varied from a couple of heavyweight coaches on mid-day trains to 8 or 10 cars during rush hour. Heavyweight coaches were the norm until they were supplemented with former long-haul cars that had been replaced by new lightweight equipment. Some of these older coaches were refitted with high-density seating for their new job.

For modelers, Bachmann's Spectrum series HO scale P70 coaches fit remarkably well into either Pennsylvania or Pittsburgh & Lake Erie railroad commuter trains. [Walthers and Broadway Limited Imports also make HO scale P70 coaches. – *Ed.*] All you need is a GP9 with a steam generator and two to four coaches to replicate the PRR heavyweight trains that once operated between Chicago and Valparaiso, Ind., and on the P&LE near Pittsburgh, Pa.

Of course, modelers can use nearly any of the current crop of heavyweight steel coaches for a freelanced commuter service on their own railroad.

BI-LEVELS AND PUSH-PULL

While bi-level cars and push-pull trains seem relatively new, both concepts date back several decades. The first double-deck commuter car was operated on the LIRR in 1932. And the origin of bi-directional passenger service can be traced to the operation of heavy electric multiple-unit trains, where changing direction is a simple matter of the operator (engineer) walking to the other end of the train.

The Budd Co. built its first bi-level gallery cars for the Chicago, Burlington & Quincy in 1950. These fluted, stainless-steel cars provided more passenger capacity within a given train length. The Chicago & North Western also bought similar gallery cars, but its fleet came from Pullman-Standard in a striking bright yellow and green color scheme. Both railroads operated these new gallery cars in the traditional fashion, using passenger locomotives that had to be turned after every trip.

In 1960, C&NW introduced the push-pull concept to North America by adding an engineer's cab to one end of a gallery car. This high vantage point allows the engineer to operate the locomotive by remote control from the "rear" of the train during the inbound trip with the engine pushing the train.

Changing direction is a matter of isolating the controls on one end, walking to the opposite cab, and activating the controls at that end. This ability to change direction allows some trains to make express trips directly to heavily patronized stations, followed by a quick

In July 1987, a Massachusetts Bay Transportation Authority (MBTA) commuter train has departed from the Boston station and is rolling across the Four Points Channel bridge. Marc Grinter photographed the EMD F40PH locomotive with a train of Budd RDCs rebuilt as coaches.

empty return to the terminal to pick up another load.

Most push-pull trains are oriented with the diesel locomotive on the outbound end of the train. This reduces the noise and fumes patrons encounter in the downtown trainshed, especially during rush hour.

In the Northeast, the push-pull concept was applied to single-level cars operating on the Erie Lackawanna and other routes. These Horizon cab cars have been made by Walthers in HO scale and are available in the road names of several Eastern commuter rail systems that currently operate them, including NJ Transit and Metro North.

Modeling a push-pull train involves careful installation and adjustment of the couplers, since the locomotive will be shoving the cars half of the time. You'll also need some empty storage tracks so extra coaches can be parked until needed for peak travel times.

On a layout, the first inbound trip of the morning rush hour could begin with a three- to six-car consist in push mode. This train moves from a storage track to the station, loads passengers, and departs for the city. Upon arrival, the engine could lead a dead-head trip to the suburban station to begin another rush hour run to the city. Another possibility would have the outbound train make all the normal stops for reverse commuters heading for jobs in the suburbs.

After rush hour, the crew could set out four cars in a storage track and run the remaining two-car train for daytime service. By mid-afternoon, any stored cars would be returned to the train to regain its rush-hour capacity.

COMMUTER RAIL AGENCIES

A new era of commuter rail service dawned in the 1970s, when railroad services were generally in poor shape. Since these commuter services were crucial to the economic well being of city-suburban corridors, some state governments began subsidy programs to continue safe train operations, provide maintenance, and promote new levels of growth.

Regional transportation agencies were organized by state transportation departments to run commuter rail services. These agencies soon began operating railroad systems such as Metra (Chicago Regional Transit Authority), Metro North Commuter RR (New York City area), NJ Transit (New York City-New Jersey area), and the South Shore Line (Northern Indiana Commuter Transportation District-Chicago area).

Many of the original railroad names were dropped as the agencies renamed their passenger services and added bold color schemes. Some incorporated the host railroad's name into the new commuter system paint schemes.

In the Chicago area, commuter cars often carry heralds from Metra and its host railroads, including BNSF Ry. and Union Pacific. New stainless-steel electric cars operating on the South Shore Line include the name Chicago, South Shore & South Bend RR on the letter boards with heralds from the railroad and the Northern Indiana Commuter Transportation District (NICTD) on the car ends.

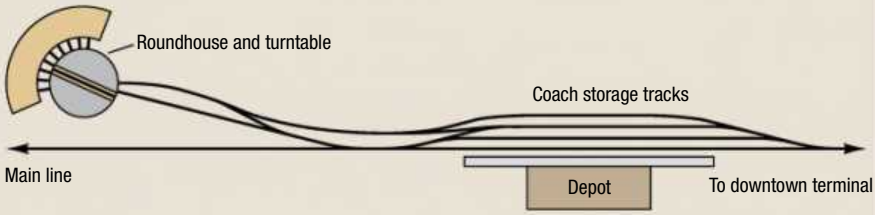
INTO THE 21ST CENTURY

A new chapter of commuter railroads began in the 1980s and 1990s as regional rail passenger service blossomed. New services were developed to serve growing metropolitan centers such as: *Coaster* (San Diego), GO Transit (Toronto), MetroLink (Los Angeles), *Sounder* (Seattle, Wash.), Trinity Railway Express (Dallas and Fort Worth), Tri-Rail (Miami), Virginia Railway Express (Washington, D.C.), and West Coast Express (Vancouver, Wash.).

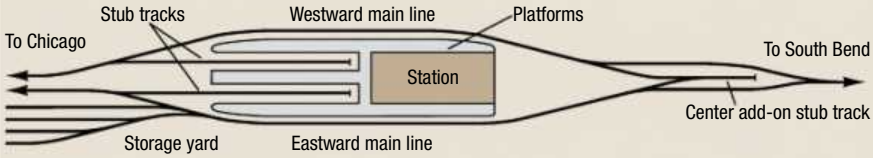
The modern commuter rail systems offer plenty of potential for some colorful modeling, and many of the new commuter routes use bi-level, push-pull cars built by Bombardier, among other builders. A variety of motive power is also used, including the latest cowl-body diesels.

Manufacturing lead times often result in initial service start-ups that involve equipment borrowed from other commuter rail agencies. Seattle's Sound Transit and GO Transit have loaned equipment for test runs or the initial start-up of new train services. One example was the use of *Sounder* equipment with a BNSF Ry. diesel powering test runs in the Minneapolis area.

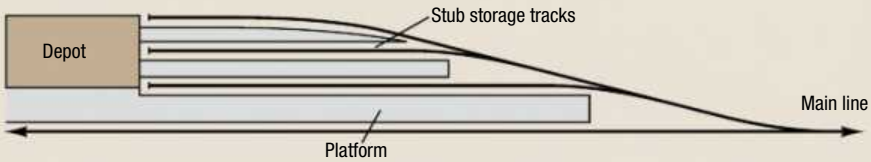
MODEL TERMINAL IDEAS



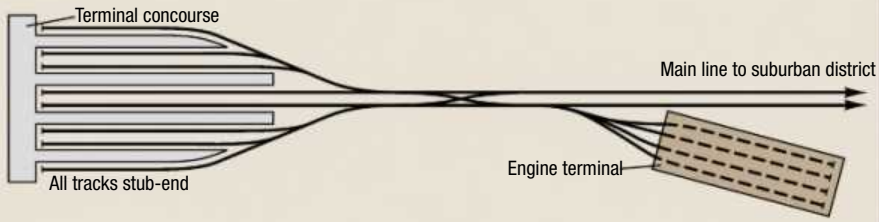
STEAM TERMINAL. This small storage area is parallel to a single-track main line adjacent to the suburban station. It could serve as either an end terminal or an intermediate station to originate more trains in high-traffic areas. A nearby turntable or wye turns locomotives between trips.



INTERMEDIATE TERMINAL. Here's a terminal designed to handle consist changes in trains of multiple-unit cars on the South Shore Line at Gary, Ind. The main line splits and passes around both sides of the platforms. A four-track yard at the west end provides storage for equipment. Two stub platform tracks serve trains that originate or terminate here. The center stub track at the east end is used to remove cars from eastbound through trains and add them to westbound trains for additional seating in the line's high-traffic areas.



SUBURBAN TERMINAL. With today's push-pull service, a series of stub tracks can easily hold the gallery car consists. Upon arrival, the crew unloads the passengers, moves the empty train into one of the storage tracks, and locks up the equipment for the overnight layover.



TRADITIONAL CITY TERMINAL. Downtown terminals are busy places with numerous stub-ended tracks. Conventional trains must be switched to release the locomotives for servicing and turning. Push-pull trains have eliminated most of these switching assignments and the light engine movements.

STATIONS AND TERMINALS

Commuter stations range from simple shelters to elaborate masonry structures, depending upon ridership and local political influence. Paved loading platforms run along one side of a single mainline track or both outer sides of a double-track line. The station building is normally placed on the inbound side of a double-track line with a small shelter on the opposite side. Large, paved parking lots must also be provided for the commuters' vehicles.

Terminal areas are more complex, since they handle servicing, switching, car storage, and train layovers. Systems

The MBTA operates Horizon coaches including some push-pull cab cars. Brian Cudahy photographed car no. 1309 after its red marker lights (top corners) were turned on in preparation for an outbound trip from Boston's South Station.

The Milwaukee District of Metra operates push-pull trains using gallery coaches and cab cars. This six-car train has a mixed consist of five fluted-side cars and one smooth-side car. Patrick Dorin took the photo at Elgin, Ill., in March 1999.

The Northern Indiana Commuter Transportation District owns this modern electric multiple-unit train that Dave Ingles photographed in 1985. It's lettered with the Chicago, South Shore & South Bend RR host's name and both heralds.

using electric multiple units or Rail Diesel Cars (RDCs) had the simplest track layouts. All they need is a few stub-end tracks to hold the trains.

Suburban terminals used by conventional trains generally had a turntable or wye and adjacent tracks for overnight equipment storage.

The downtown terminal is the busiest place on any commuter rail system, so it offers the most design flexibility. The tracks are usually all stub-ended, which means conventional trains had to be switched each trip.

Arriving steam- or diesel-powered trains pulled in and stopped about a car length short of the bumper so the road locomotive could be uncoupled and moved forward. A switcher shifted the empty cars to another track to release the locomotive so it could back out. Following routine servicing, the locomotive was turned for its outbound trip and dispatched to the terminal in time for its next departure.

In the meantime, switch engines rearranged train consists and removed any cars that needed cleaning, inspections, or repairs. With push-pull trains the diesels remain at the front of the outbound train, so switchers couple onto the road locomotives to rearrange consists throughout the day.

TYPICAL TRAIN SCHEDULING

Commuter schedules depend on the number of passengers the trains carry each day. Service levels range from one train each way (a.m. inbound and p.m. outbound) to complex 18- to 20-hour operations. Rush-hour trains operate on 5- to 20-minute headways, but daytime runs can be anywhere from a half hour to 2 hours apart. Some commuter lines offer evening and weekend schedules.

Extra trains may be run for sporting events, carnivals, concerts, and other downtown activities. The logistics of scheduling the equipment and trains for these special movements can be an enjoyable and interesting part of modeling commuter service.

EQUIPMENT ASSIGNMENTS

Most commuter services schedule their consists of push-pull cars to make several trips per day. These multiple trips make efficient use of the equipment. Routine maintenance is done during the longer layovers, or individual cars or locomotives can be swapped out of the operating sets between trips.

The top right diagram shows how three train sets can cover 22 commuter trains.

Each color represents one set of push-pull equipment.

Three trains operate in each direction during the morning rush between 6 and 8 a.m. Then the time between trains grows to about 2 hours during the middle of the day. Evening rush trains are concentrated between 4 and 7 p.m.

With this schedule, train sizes can be reduced during the day and then expanded to carry maximum loads during the evening rush hour. Note that each consist winds up at the same terminal it starts from.

Saturday and Sunday service could involve one set of equipment making three round trips from the suburban terminal beginning in the early morning. A second trip could depart in the late morning, with a late afternoon third trip that returns in the evening.

MODELING IDEAS

Adding commuter rail service to an existing layout can be done by sharing track and facilities, just like the prototype. One example would be a fictitious commuter service linking Benton Harbor, Mich., to Chicago. If we think of the freelanced route as an extension of the real South Shore Line, the agency can be the "Michigan South Shore Commuter Rail." In theory, our Michigan South Shore (MSS) trains would originate from Benton Harbor, run 39 miles over the freelanced model railroad to Michigan City, Ind., and then transfer to the Chicago, South Shore, & South Bend RR to travel into Chicago.

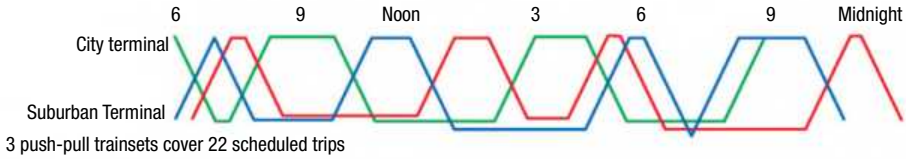
As a practical matter, the MSS train could be kept on a concealed double-ended staging track. The commuter train can then appear at the appropriate times, run across the railroad, and disappear onto the South Shore at Michigan City (return to staging). Since it's a push-pull consist, the train can reappear running in either direction as needed.

EASY ADAPTATION

With its wide variety of train operations; equipment; motive power; and station, yard, and terminal designs, it can easily be adapted to almost any model railroad with an urban setting. Modelers also have many eras to choose from, since change happens slowly and items from different eras often overlap, sometimes for decades.

Hobby manufacturers have done a fine job of supplying commuter locomotives and rolling stock, so modelers can concentrate on train operations and the railroad setting. HTMTR

Push-pull daily commuter service



3 push-pull trainsets cover 22 scheduled trips

New Mexico's *Rail Runner Express* trains carry one of the most striking new paint schemes: a huge road runner bird is painted on the locomotive with tail feathers extending back across the sides of the bi-level passenger cars. Patrick Dorin photographed the locomotive on display in Albuquerque in June 2006.

GO Transit no. 710, a GP40-2W, powered this five-car consist of new bi-level coaches built by Bombardier. A rebuilt FP7 served as the control cab on the opposite end when Jim Hediger photographed the train in January 1984.

PROTOTYPE COMMUTER EQUIPMENT

- Heavyweight coaches with high-density commuter seating served railroads in all parts of the country.
- Lightweight coaches from discontinued intercity services were sometimes transferred to commuter runs and fitted with high-density seating.
- Electric multiple-unit cars were similar in design to heavyweight cars. They operated on the Chicago, South Shore & South Bend; Illinois Central; Long Island; New York, New Haven & Hartford; Pennsylvania; and others.
- Lightweight electric multiple-unit cars were also built and used on the New Haven, Pennsylvania, South Shore, and others.
- Rail Diesel Cars (Budd RDC) were used on many Northeastern and some Midwestern lines, including the Baltimore & Ohio, Boston & Maine, Chicago & North Western, New Haven, and others.
- Bi-level, streamlined, multiple-unit electric cars operate on the Chicago Metra's Illinois Central electric route.
- Gallery coaches have a single row of upper seats on both sides of the car. These cars are common on Chicago's Metra system and Southern Pacific's Peninsula "Commute" service.
- Bombardier bi-levels have two floors with paired seating on both levels. These cars operate in Canada and on West Coast commuter services. – *P.D.*

MODELING THE SOUNDS OF PASSENGER DIESELS

A sound-equipped Kato HO scale F40PH pulls its train into Mukwonago on *Model Railroader*'s club layout, the Milwaukee, Racine & Troy. Bob Kingsnorth tells how to model this and other Amtrak locomotives' distinctive sounds with Digital Command Control sound decoders. Steven Otte photo

Advances in DCC sound help better simulate the sound of Amtrak head-end power

BY BOB KINGSNORTH

AMTRAK'S DIESEL-ELECTRIC

locomotives are based on the same technologies as freight diesel-electric locomotives. For the most part, the sounds of diesel engine exhaust, turbocharger, dynamic brake fans, and other equipment will be the same. However, the need to supply electrical power to passenger cars creates special demands on passenger locomotives, and that produces sounds different from those of a freight locomotive. Then there's the railroad's choice of air horns, which may be a distinguishing characteristic. Amtrak is no exception.

HEAD-END POWER

Today's passenger cars are all-electric. Electricity powers the lights, heating, air conditioning, and all other onboard utilities. This electricity, called head-end power (HEP), is usually supplied by a separate generator in the locomotive. The HEP generator is often driven by a direct coupling to the engine, which must run at a constant RPM to maintain the 60-cycle power supply. Amtrak's F40PHs need to run at full RPM (throttle notch 8) to provide HEP, earning the locomotive the nickname "Screamer." Variable power to the traction motors is controlled by varying the electrical excitation to the main generator, rather than varying the diesel RPM, the standard freight locomotive practice.

Amtrak's latest Genesis locomotives (P40 and P42, also called AMD-103) and General Electric's Dash 8-32BWH (the P32), also all use a direct-coupled generator for HEP. As long as these units are supplying HEP to a train, the motor is running at a constant high RPM.

Because the technology to synchronize two or more HEP generators isn't practical, only one locomotive can supply HEP for a train. A single HEP unit

can supply electricity to more than 20 Superliner cars, fewer in summer and winter when air conditioning and heating loads increase. Typically Amtrak runs 15 or fewer passenger cars in a train, so a single HEP serves the purpose. Therefore, in a multiple locomotive consist, only one locomotive will run at constant high RPM, and all other units will run with variable RPM.

Any of the locomotives can supply the power. Many engineers prefer to run HEP in a trailing unit to put the incessant noise as far as possible from the lead unit's cab. Others run HEP in the lead unit because it gives them quick access to the controls and equipment.

The F40PH "Screamer" runs at about 900 RPM when used for HEP. Today's P42 and P40 run at about 900 RPM, and the P32 also runs at about 900 RPM. The F59PHI, introduced by Electro-Motive Division in 1994, has a standalone HEP generator set in the rear, so the diesel engine responds directly to the engineer's throttle with variable RPM. An earlier Amtrak locomotive, GE's P30CH, had two stand-alone generator sets for HEP, so the engine wasn't constrained by HEP requirements.

When Amtrak was formed in 1971, many passenger cars used steam to power utilities in the cars, in addition to wheel-driven generators or even generator sets in a car. The steam was generated by a diesel-fueled boiler in most passenger diesels, so the main diesel engine was independent of power requirements for the cars. The steam boiler configuration was typical of many of the diesels used in Amtrak's early days, including EMD's E- and F-series cab units and SDP40Fs acquired by Amtrak. The passenger and freight units would have the same diesel sounds with variable RPM.

AIR HORNS

Air horns and steam whistles have long been the "voice" of a locomotive, and the horns produce a wide variety of sounds, from shrill to mellow. Some railroads have standardized on a specific manufacturer and model, although the selection may change in time.

Many Digital Command Control sound decoders are factory-programmed with a variety of horn sounds. Choosing which sound plays when the horn button is pressed is as simple as programming a configuration variable (CV). Picking the right horn makes your locomotive sound more realistic.

When Amtrak was formed in 1971, it inherited locomotives from many roads,

An interactive display of air horns used on Amtrak diesels over the years was shown on board Amtrak's 40th anniversary train. Cody Grivno photo

AMTRAK LOCOMOTIVES AND SOUNDS

SELECTED EXAMPLES OF HO AND N SCALE Amtrak locomotives and drop-in board-replacement decoders are outlined below. This list includes only sound decoders designated for the Amtrak model. Other decoders may also work, subject to space and sound limitations.

PROTOTYPE	MODEL	SOUND SYSTEM SUGGESTIONS
P40/P42/P32AC-DM	Athearn HO Kato HO	SoundTraxx TSU-AT1000 no. 828046 fits in Athearn model. Kato model available with factory installed SoundTraxx or ESU LokSound Select decoder.
P40/P42/P32AC-DM	Kato N scale	Digitrax drop-in board replacement SDN-144K0A, requires a download of C44-9 sounds to replace the F40PH sound – or MRC drop-in board replacement no. 1645
P32 (8-32BWH)	Atlas HO	Gold Series models contain a QSI sound decoder. Or substitute SoundTraxx TSU-1000 no. 827107
P32 (8-32BWH)	Atlas N scale	No drop-in sound decoder
F59PHI	Athearn HO	SoundTraxx TSU-AT1000 no. 828042
F59PHI	Athearn N scale	The model is available equipped with a SoundTraxx sound decoder; there is currently no aftermarket equivalent.
F40PH	Kato HO Rapido HO Walthers HO	Kato and Rapido models available with factory-installed ESU LokSound Select decoders. Walthers Mainline model available with SoundTraxx decoder.
F40PH	Kato N scale	Digitrax drop-in board replacement SDN144K0A – or MRC drop-in board replacement no. 1810
P30CH	No current model	The P30CH was based on the U30C freight diesel, so a sound package from that family (the GE FDL-16 3000 HP diesel) is appropriate.
SDP40F	No current model	The SDP40F and FP45 have some resemblance. Athearn HO and N scale FP45s are offered with SoundTraxx systems – and MRC drop-in board no. 1832 fits the N scale model.
E8/E9/F series	Many	There are numerous HO and N models offered with sound systems and several available sound decoders.

most of which kept their original air horns. There was no effort to standardize them. For transition-era vintage engines, photos of the locomotive may identify the air horn used, or you could select an air horn based on the standard of the locomotive's original railroad.

This changed with the first new locomotives purchased by Amtrak, the SDP40F. These were delivered with the Leslie SL-4T. Amtrak's P30CH and first 30 F40PH were delivered with the Nathan P5a horn. The Nathan K5LA air horn was developed for Amtrak, and beginning with the F40PH in 1976, Amtrak adopted and standardized on that Nathan air horn.

Other railroads have purchased the Nathan K5LA, but that air horn remains Amtrak's voice today. More info on air horns and sound samples are available from the Santa Fe Subjects website (atsf.railfan.net/airhorns).

A pair of General Electric P42 locomotives pulls the *Empire Builder* through Pewaukee, Wis., in August 2008. Amtrak engineers operating multiple-unit locomotives often set the trailing unit to provide head-end power to the train, to put the constant high-speed engine noise farther from the cab. Cody Grivno photo

AMTRAK DIESEL SOUNDS

Because the industry is constantly improving and adding new products, the following information must be considered a snapshot in time.

Digitrax, MRC, and SoundTraxx decoders use configuration variables to set "manual notching," allowing the engineer to set and hold a constant RPM diesel sound as needed to model HEP. [ESU LokSound and Train Control Systems WOWSound decoders also support manual notching. – *Ed.*] When this CV is set, pressing a function button on the throttle increases RPM to the appropriate notch. A second button reduces RPM.

Older QSI decoders don't provide for manual notching, but they do have a CV that governs the number of engine notches per speed step, allowing you to simulate HEP. Setting CV 55.21.0 to a value of 1 will have the motor sounds at full RPM by speed step 8. QSI's Titan line of decoders include built-in HEP.

The Nathan K5LA air horn is the default air horn for Digitrax decoders designed for Amtrak locomotives. Decoders from MRC allow you to select among various air horn sounds, though none are identified by type. SoundTraxx decoders allow you to select from 16 air horns sounds, and the K5LA is identified. Titan decoders by QSI have multiple air horn sounds, as well as custom horns that can be programmed by combining individual chime sounds.

Information for finding appropriate engine sounds and a good overview of air horns is available at the SoundTraxx website, www.SoundTraxx.com. The home page has a link to "Choosing the right sound system," then a link to "Choosing the right diesel sound." The diesel sound page has an extensive list of locomotives and related families. For example, if you are searching for the sounds of an F59PHI, the list identifies the diesel engine as a turbocharged EMD 710, and lists 14 other locomotives that will produce similar sounds.

Thanks to the efforts of decoder manufacturers, you're now equipped to accurately reproduce the unique sounds of Amtrak diesels. Have a blast! HTMTR

LOCOMOTIVE HEAD END POWER CHARACTERISTICS SYSTEMS

AMTRAK ROAD LOCOMOTIVE	MANUFACTURER	ERA	HEP	DIESEL SOUND WITH HEP
P40/P42	GE	1993 to present	Direct coupled generator	Constant notch 6
P32AC-DM (diesel/3rd rail)	GE	1996 to present	Inverter powered from main generator	Variable RPM between notch 3 (when idle) to notch 8 when diesel powered
P32 (8-32BWH)	GE	1991 to 2003 *	Direct coupled generator	Constant notch 6
F59PHI	EMD	1994 to present	Standalone generator set	Variable RPM
F40PH	EMD	1976 to 2001	Direct coupled generator	Constant notch 8
P30CH	GE	1975 to mid-1980s **	Two standalone generator sets	Variable RPM
SDP40F	EMD	1973 to 1979 **	Steam boiler	Variable RPM
E8/E9	EMD	1971 to late 1970s	Steam boiler	Variable RPM
F series	EMD	1971 to late 1970s	Steam boiler	Variable RPM

* P32 (8-32BWH) locomotives were assigned to yard duty by 2003, but are still used for stand-in road duty today.

** Derailments of the SDP40F prompted early retirement of these locomotives. Concerns over 3-axle trucks also prompted early retirement of the P30CH.

SECTION 5

MODERN INDUSTRIES

Don't think you have the room to model modern industries? Guess again. In this section, you'll read about ways to capture the look of big business in little space. Here, Joseph Kreiss attached printouts of shipping containers to foam core to make his compact HO scale intermodal yard scene look much larger. Joseph Kreiss photo

Modeling big industry doesn't always require a lot of space

BY CODY GRIVNO

FANS OF THE MODERN ERA know that today's Class 1 railroads run long trains and lots of them. Mile-plus long trains of intermodal containers, coal, and crude oil, among other commodities, are the norm. But unless you're a member of a large model railroad club or are blessed with an expansive basement or room in your house, re-creating these long trains isn't possible. However, with the tips in this section, you can convey the sense of big-time railroading in a relatively small footprint.

If you're looking for ways to add more industries to your model railroad without adding more track, you'll want to read Alan Saatkamp's article on page 64. He cleverly added four new customers to his portable industrial park switching layout in approximately 4 square feet without adding a single structure or laying one piece of track.

Of course, layouts also need brick-and-mortar destinations for railcars. On page 66 professional railroader Jim Lincoln shares some sweet ideas (pun fully intended) on how to model a corn syrup transloading terminal. What's cool about this industry is that the tank cars must be spotted in specific locations based on the grade of corn syrup they're carrying. In addition to the detail-oriented switching operations, the corn syrup terminal also affords chances to superdetail an industry, since the unloading takes place outdoors. Jim also shares information on where you can find corn syrup tank car models for your layout.

Joseph Kreiss wraps up this section with an article on how to build a container yard backdrop, which is shown above. Though the container yard on Joseph's layout is in a relatively small, triangle-shaped space, he makes the scene look much larger by scanning HO scale containers, attaching the printed images to foam core, and putting the finished assembly on the backdrop. With a few 3-D containers in the foreground, the results are quite convincing.

If you're looking to model today's railroading action but don't have a lot of space, I hope you'll give one or more of these techniques a try. Some of these projects can be completed in an evening, while others require a bit more time. Regardless which one you choose, you're sure to have fun and add to the enjoyment of your model railroad. HTMTR

ADD MORE INDUSTRIES WITHOUT ADDING TRACK

Outdoor customers expand a modern industrial park on this portable HO scale switching line

BY ALAN SAATKAMP
PHOTOS BY MATT SAATKAMP

FIG. 1 WEST END. **The open industries on Alan Saatkamp's HO scale layout are mostly located on existing spurs near the west end of the industrial park. Here you can see the relationship between new customers and those with buildings.**

ONCE ALL THE TRACK is laid and the scenery and structures are in place, you may think your layout is nearly done. But there's still plenty of opportunity to increase traffic, add variety, and enhance industrial switching. Here's how I did it on my portable HO scale switching railroad.

My inspiration was Jim Hediger's railroad-you-can-model article on the prototype Progressive Rail's Airlake Industrial Park, published in the June 2002 *Model Railroader*. Lakeville, Minn., is the home of this busy development, which is made up of light industries that provide some excellent examples of how to add car spots without adding track.

Jim's article inspired me to build a 2'-6" x 13'-4" HO scale portable layout on two hollow core doors with a layer of 1" foam board laminated on top. The railroad has two sections that I connect end-to-end for operation. **Figure 1** shows only the western half of the railroad, but it just takes a few minutes to add the similarly constructed east end and get trains running. The complete layout is shown on the track plan.

SELECTIVE COMPRESSION

My HO scale version is selectively compressed, but its west end is still anchored by a large warehouse and office building that's surrounded by many industries. My condensed HO model of Progressive Rail's Freight House No. 1 has two tracks leading into its east end, with two spurs south of the building and one on the north side. The latter is a switchback leading to Wausau Supply, a distributor of building products.

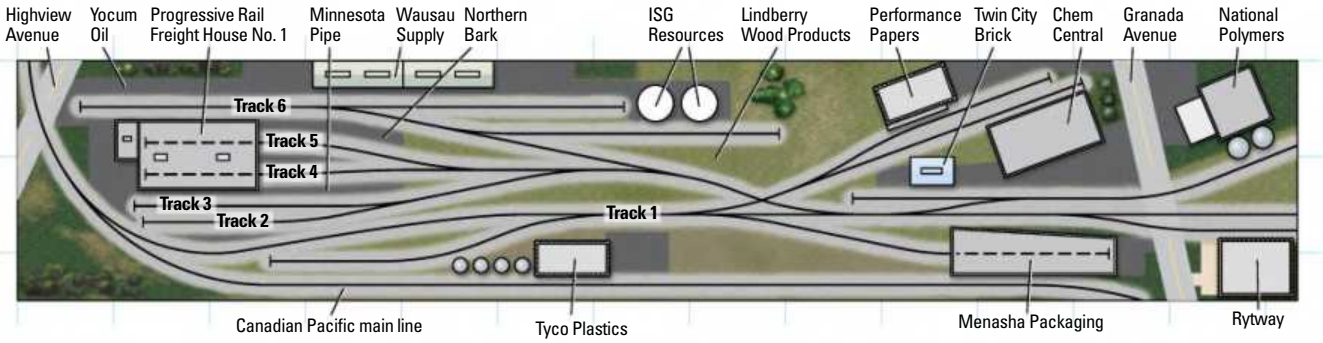
At first it might appear that the switchback and the two spurs leading into the warehouse all serve single purposes. But, like the prototype, I've been able to work in four new customers in about 4 square feet of layout space using existing tracks.

Figure 2 shows the west end of the prototype industrial park, which fills an area of about 2 square miles near an interstate highway.

OPEN INDUSTRIES

My industrial park's west end features numerous car spots that don't require their own spur or building. Most of them are close to Freight House No. 1 near the entrance to the park. Each of these spots adds switching possibilities.

Most of these new businesses are what I call "open industries" because



Progressive Rail Airlake Industrial Park

HO scale (1:87.1)
Layout size: 2'-6" x 13'-4"
Scale of plan: ½" = 1'-0", 12" grid
Illustration by Rick Johnson

they have offices nearby but deal in products that are unaffected by the weather. The trick here is to figure out ways to model them in a minimal space. Here's what I did:

1. Yocum Oil. This firm receives bulk petroleum products directly from tank cars and makes local deliveries with its tank trucks. These transfers occur on a spur track, so a paved parking spot is all that's required. Since many operators ignore track diagrams, I park a tank truck next to the spur as a visual cue.

2. Minnesota Pipe. A load of banded steel pipe next to the spur leading into freight house door no. 1 provides another visual cue to easily identify where to spot inbound loads of pipe. Minnesota Pipe doesn't need indoor storage space for its rugged product, so it leases space in the lot and uses a rented crane to transfer the pipe to flatbed trucks.

3. Northern Bark. This business sells shredded bark that arrives in hi-cube wood-chip gondolas. Since the bark is used for decorative landscaping, I modeled it as a pile on the pavement near Freight House No. 1 with a small end loader and some delivery trucks nearby.

4. Lindberry Wood Products. Just east of the two warehouse tracks, Lindberry Wood Products receives and stores utility poles. My poles are wood dowels that I sanded to the proper tapered shape, and stained dark brown. I laid a small pile of poles on the layout as a cue for spotting the loaded flatcars so the poles can be unloaded with a rented crane.

Although my layout was designed with specific industries in mind, this practice could easily be applied to any location where freight car access is available for a truck or a crane. As you can see in **fig. 3**, it can keep a two-man operating crew busy. HTMR

THE LAYOUT AT A GLANCE

Name: Airlake Industrial Park
Scale: HO (1:87.1)
Size: 2'-6" x 13'-4"
Prototype: Progressive Rail
Locale: Lakeville, Minn.
Era: present day
Style: portable walkaround
Mainline run: 13 feet
Minimum radius: 26"
Minimum turnout: no. 5
Benchwork: portable sections built on two hollow core doors
Height: 50"
Roadbed: Woodland Scenics Track-Bed
Track: Atlas code 83 flextrack
Scenery: foam insulation board textured with ground foam
Control: Digitrax Digital Command Control

FIG. 2 PROTOTYPE PARK. Progressive Rail's Airlake Industrial Park is a compact complex of tracks and transfer points that serve a wide variety of industries. Jim Hediger photo

FIG. 3 OPERATING. Alan and his son, Matt, switch industries on their portable HO switching layout built on a pair of hollow-core doors. This is the western half, which includes most of Alan's new "open industries" near Freight House No. 1.

Modern tank car transloading points are compact, yet busy, industries. High-fructose corn syrup is moved by rail to locations such as the Tate & Lyle plant in Westborough, Mass.

A MODERN INDUSTRY FOR A COMPACT SPACE

Though small in size, a corn syrup transloading terminal offers plenty of switching opportunities

BY JIM LINCOLN
PHOTOS BY THE AUTHOR

IF SOMEONE ASKED YOU to name the three most-shipped products on CSX, your first guess would undoubtedly be coal – no surprise there. Next would come automobiles and trucks (still). Third? Would you have said corn syrup?

Though people have strong feelings, both pro and con, about high-fructose corn syrup (HFCS), this product – or rather the shipping of it – has been important to railroads since the 1970s. That's when the United States Secretary of Agriculture approved its production as a way to help struggling American corn farmers.

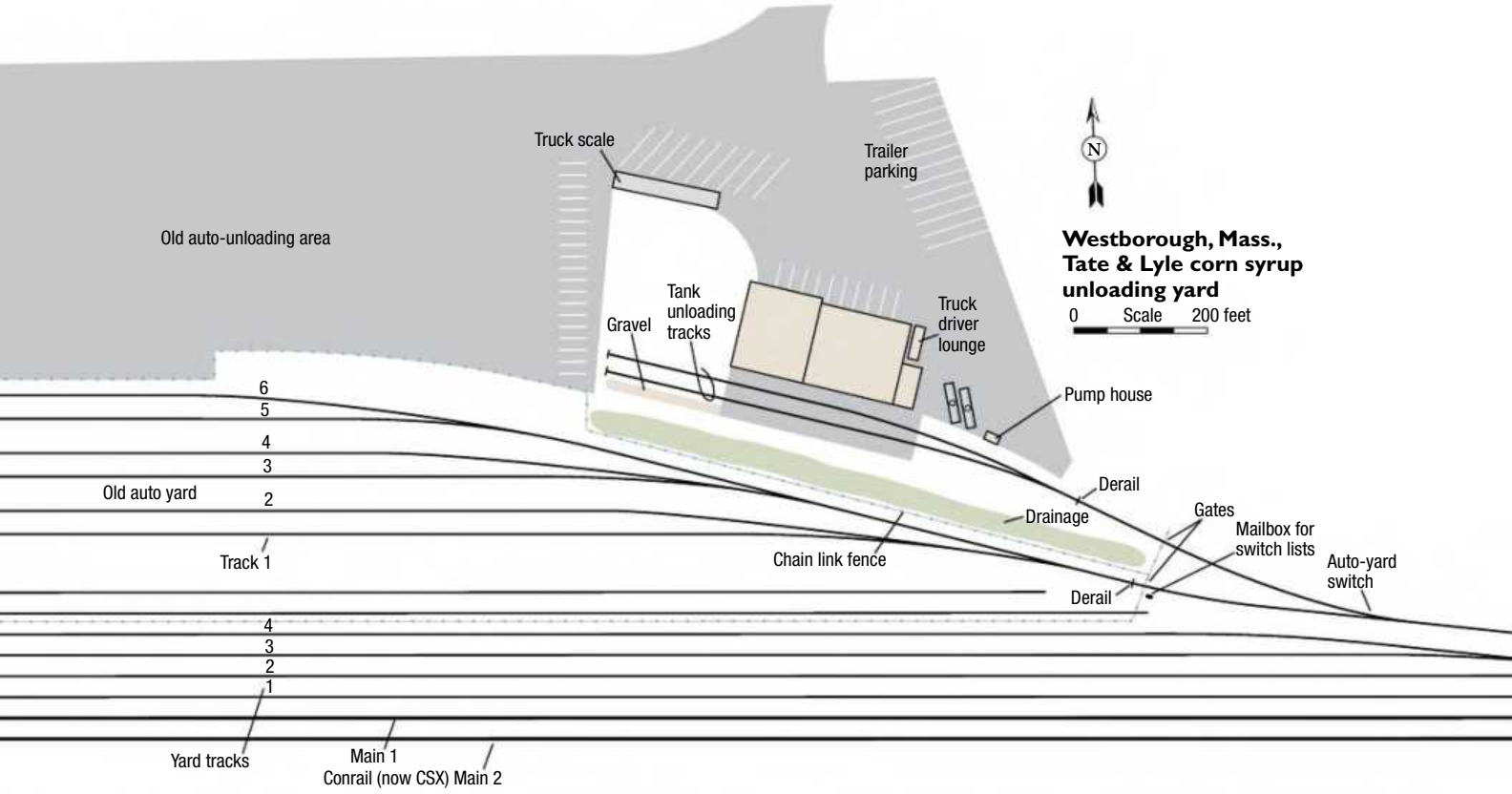
I never would have guessed HFCS was the third-most-shipped product on CSX. It makes sense, however, if you think about cars in a manifest freight. There may be more boxcars or covered hoppers, but there could be a variety of products in these cars. When you see tank cars labeled "corn syrup," it's either loaded with the sweet commodity or empty. Nothing else can be loaded in those cars.

Modern tank car transloading points are compact, yet busy, industries. High-fructose corn syrup is moved by rail to locations such as the Tate & Lyle plant in Westborough, Mass.

MODELING THE HFCS INDUSTRY

With high-fructose corn-syrup shipments down because of bad press and a general move away from sweetened soft drinks, it's still common to see corn syrup tank cars in a train. If you're modeling an era from the mid-1970s to the present, the HFCS industry and its products should be well represented.

"Wait a minute," you say. "I don't have that kind of space for one industry!" That may be true if you're thinking of modeling a plant that produces HFCS. To get some sense of the scope of modern corn syrup production, take a look at aerial photos of the Archer Daniels Midland (ADM) plant north of Cedar Rapids, Iowa, on Google Earth or using the Bird's Eye view on Bing. It's quite an impressive industry.



Modeling the destination of HFCS is a different story. Here we find a compact industry that generates a large volume of traffic, particularly by modeling standards. If you're modeling a metropolitan area, including one or more HFCS terminals would be a great traffic generator, even if you don't have a lot of space on your layout.

TRAFFIC THEN AND NOW

The Tate & Lyle (formerly Staley) terminal in Westborough, Mass., typically receives five cars per day during the week, with an equal number of empty outbound cars. The terminal is also switched on weekends occasionally to prepare for the work week.

Until a few years ago, the ADM terminal adjacent to CSX's Nevens Yard in Framingham, Mass. (8 miles east of the Tate & Lyle terminal) received two or three cars in and out five days per week. The Framingham terminal is now closed; the traffic is now apparently handled at a Trans-flo site in Worcester, Mass., on the Providence & Worcester, 15 miles west of Tate & Lyle. Ken's Foods, north of Framingham, receives corn syrup cars every other day, and there's another HFCS terminal served by the Springfield Terminal near Ayer, Mass.

Those numbers are typical of traffic around Boston today. A few years earlier, however, the terminals were much busier. For example, the terminal in Framingham

This view of the south side of the Tate & Lyle plant was shot from the former auto-unloading yard. The yellow paint on the web of the rails in the foreground indicates where the clearance points are for spotting cars.

A gate and derail protect the entrance to the Tate & Lyle unloading tracks. The former Conrail (ex-New York Central) yard is in the background.

These two photos show how the hoses from the pump house at Tate & Lyle are draped along the track where the corn syrup tank cars are unloaded. The plastic blocks in the foreground keep the hose ends off the ground.

(still called Amaizo's even though it was owned by ADM) had three tracks that could hold 15 to 20 tank cars. Within the last eight years, that terminal required a "full switch" – all cars in and out – twice a day, five days a week. That plant was receiving 40,000 tons of HFCS per month, or about 30 cars per day.

SWITCHING THE TERMINAL

What makes a corn syrup transloading site so interesting is the amount of time it takes to switch. It's not as simple as putting identical black tank cars on a pair of tracks. At the ADM terminal in Framingham, a local crew switched just this industry. It wasn't uncommon for inexperienced crews to run out of hours switching the plant just one time. It seems pretty straightforward: 15 cars in, 15 out. So why does it take so long?

Corn syrup (at least HFCS used by Tate & Lyle) comes in at least six grades: 55 (or 5500), the thinnest grade and the one used in soft drinks, is the most common; 100; 130 (or 1300); 180; 200; and 300. The latter is the thickest grade and common in ice cream. The other four are used by bakeries and candy companies.

The different grades of corn syrup can't be mixed. If a storage container has a particular grade in it, the container, lines, and hoses leading to it all must be for the same grade. If they aren't, they must be steam cleaned to prevent cross-contamination.

To that end, the switch list we use to set out cars at the three-track ADM terminal requires that each car be placed in a specific spot. This is often different than the order in which cars arrive in the inbound train. We therefore have to block loaded cars, remove the empties, and put the still-to-be-unloaded cars back in their original spots.

The Tate & Lyle terminal switch is generally simpler because it doesn't require specific spotting unless cars with other than 5500-grade corn syrup ("specials") are in the cut. These cars must be placed in specific spots and put back in the same spot if they aren't empty and the surrounding cars are. This plant has two tracks with a capacity of 13 cars – five on the outside track and eight on the inside.

A wrinkle: Cars on the inside track foul the switch when they're spotted. What makes switching this plant interesting is the need to put cars back in the spot from which they were pulled when

ONE IS A MILLION

NO, THE TITLE ISN'T A TYPO that should read "One in a million." Did you know that when you see a loaded corn syrup tank car filled with 5500-grade high-fructose corn syrup (HFCS), that single car carries enough sweetener for more than a million cans of soda?

The cars used in the HFCS business come in two varieties, 17,600- and 19,600-gallon cars. The majority of these cars were built by Trinity Industries. The carbuilder produced the 17,600-gallon cars, most of which are still in service, between 1984 and 1998. Production of the larger capacity cars started in 1998 and continues today.

Since most loading and unloading points have fixed apparatus, manufacturers can't lengthen the cars to get added capacity. Instead, they make the tank larger in diameter. To do this without exceeding clearance restrictions, the side ladders seat into indentations in the tank. The ladders allow employees at the industry to reach top hatches and hose connections.

Corn syrup tank cars are usually kept in good condition. This is presumably because the cars are used in food service. It's not unusual to have a 17,600-gallon car built in the mid-1980s look as new as a contemporary car.

Full-size corn syrup cars are painted with medium-gloss paint, whereas the paint used on models is closer to an eggshell finish. Unlike most model freight cars that, sans weathering, don't look realistic, an out-of-the-box corn syrup tank car model is actually not glossy enough.

Atlas made models of the 17,600-gallon cars in N, HO, and O scales. InterMountain offered a 19,600-gallon car in HO. Walthers produced a car of the right length and general size as a HFCS tank car, and there are many out there lettered as such, but they're not exact replicas of the Trinity cars used in this service.

Whichever car you choose, if you're modeling from the 1970s to the present, having several corn syrup tank cars in a freight train is a must. – *J.L.*

the car next to them is an empty. Also, cars with non-5500-grade corn syrup must be placed in designated spots.

In addition, the three cars farthest from the building on the inside track can't be unloaded from those spots, but they can be heated there to make later unloading easier. (Cars are loaded "hot" and retain enough heat for easy unloading during the warmer months but must be reheated during the winter.) Heated cars are moved to unloading spots to replace empties, and new inbound cars are then placed on the heat-only spots.

The Tate & Lyle plant is adjacent to the old Westborough auto unloading yard, which – until a derailment took out the yard ladder – was used for tank car storage. Tate & Lyle generally keeps 10 to 20 cars on hand. This also presents a problem, as HFCS has a shelf life of 180 days. If the product hasn't been unloaded within that time, it's deemed unfit for human consumption and shipped elsewhere to be turned into ethanol.

Good local crews put the newly arriving loads on a separate storage track or "bury" them so the older cars are first out and easier to get at. When the auto yard was still active, and now that the ladder is unusable, all switching had to be done on the lead. This made (and makes) the switchman's job significantly more difficult. Since a lack of storage space is common on a model railroad, a corn syrup terminal would make for some interesting, and time-consuming, switching.

Andy Sperandeo built this corn syrup terminal on *Model Railroader*'s HO scale club layout, the Milwaukee, Racine & Troy, following Jim Lincoln's article. The modeled industry has spots for five tank cars. Photo by *Model Railroader* staff

MODELING AN HFCS TERMINAL

If you're interested in modeling an HFCS terminal, your biggest decision will be whether to go "tankless" or not. The Westborough transloading point has all of its storage inside the building, whereas the Framingham terminal had four outside storage tanks. This affects how large your main building must be, as there is basically the same amount of storage at both facilities.

In addition, you might want to take a look at different transloading points in your area to see what type of above ground fixed piping they have. There's very little at Westborough, but quite a bit at Framingham. A terminal like Framingham would be more visually interesting, but the Westborough terminal would be significantly easier to model.

The main building at Westborough is 60 x 125 feet, dimensions I obtained not by measuring the building but by visiting the Westborough tax assessor's website and entering in the location's address. Such sites can be great modeling aids, as they typically provide the lot size, aerial photographs, and sometimes the dimensions of the buildings. You can also obtain the information by going to the local assessor's office directly. All of this information is in the public domain.

The driver lounge for an on-site trucking company at Tate & Lyle is supported on concrete blocks. Extra hoses for tank car unloading and trailer tires are stacked alongside the small barn-shaped storage shed.

Permanent piping runs along the east side of the Archer Daniels Midland unloading terminal in Framingham, Mass. One pipe serves each unloading track. There are also compressed air and steam supply lines.

Here we see the front and tank side of the Cargill high-fructose corn syrup plant in Framingham. This is easy to model with commercial kits, as Andy Sperandeo showed in the April 2011 issue of *Model Railroader* (see page 69).

Both buildings can be easily modeled using Pikestuff or City Classics kits in both N and HO scales. They can be kitbashed to closely resemble a particular building or used straight from the box. The important thing to remember is that you'll need at least one large or two smaller roll-up doors for tractor trailers to back into the building. The doors should be 13'-6" to 14'-0" high. You will also need to have at least one or two personnel doors on the track side and at least one door into the office in front.

The steam shack and pump houses can be modeled in either plastic or wood. Walthers has an industrial piping kit. The trailers are a different story, as they will have to be scratchbuilt in any scale. Several trailers are always parked at HFCS transloading points.

This prototype lends itself to progressive detailing if you want to get a model on the layout quickly to enhance operations. There isn't a lot of detail that smacks you upside the head and says, "You better put this on, or it won't look right." As you move closer in, lots of detail becomes apparent, but it could be added at a later date. That's perhaps the reason that the Framingham facility is, to my eye, a more interesting subject: All you have to include are the outside tanks for it to look like a superdetailed model without actually being one.

The driver lounge for an on-site trucking company at Tate & Lyle is supported on concrete blocks. Extra hoses for tank car unloading and trailer tires are stacked alongside the small barn-shaped storage shed.

For more information on the tank cars used in HFCS service and available models in HO and N scales, see "One is a million" on page 69.

If you're a modern-era modeler looking for a heavy-on-traffic, light-on-space industry for your layout, consider a high-fructose corn syrup transloading point. It will provide some delightfully sweet switching challenges for you and your operating crew. HTMTR

This busy intermodal terminal occupies only a narrow space on Joseph Kreiss' HO layout. Follow along as he describes how he made his own background flats to add depth to the scene.

BUILD AN EASY CONTAINER YARD BACKDROP

Use a computer, scanner, and printer to make an intermodal terminal appear larger

BY JOSEPH KREISS
PHOTOS BY THE AUTHOR

EVERY MODEL RAILROADER craves just a little more space for his layout, and I'm no different. Since my freelanced HO scale Big Island Rail is set on the Hilo side of Hawaii's big island, container shipments to and from the mainland United States and Pacific Rim ports are the railroad's main source of revenue. As you can see in the photo above, I had only a narrow strip of benchwork on one corner of the layout to model an intermodal terminal. A main feature of these yards is scores of intermodal containers stacked three or four high.

Prototype photos led me to model the stacks of containers as backdrop flats. This approach added the illusion of depth to the scene and left enough room for two rail spurs, a Mi-Jack crane, a guard shack, and numerous containers, trucks, and other equipment.

LESS CONTAINERS, LESS COST

I have many Walthers HO scale shipping containers decorated for several different shippers. However, I didn't want to cut apart these detailed models to make backdrop flats. Instead I placed the models onto the glass of my home flatbed scanner, as in **fig. 1** on page 72. I was careful to hold the top cover above the models so neither the scanner nor the models would be damaged.

FIG. 1 SCANNING CONTAINERS. **Joseph places HO container models on his flatbed scanner. This way he can scan several models at once.**

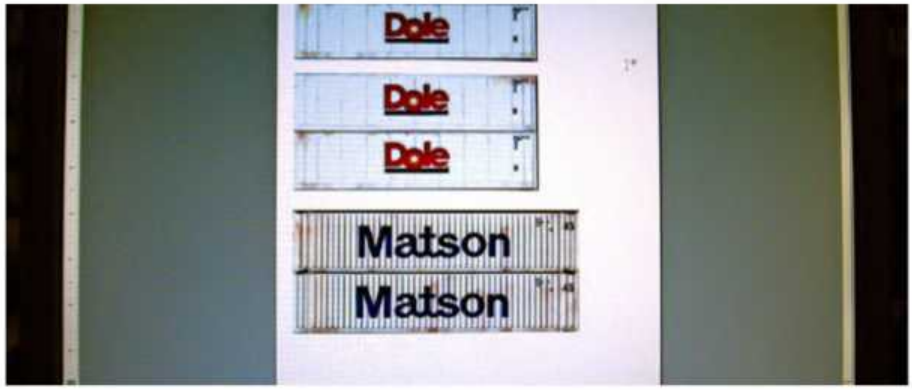


FIG. 2 ADJUSTING IMAGES. **Using Adobe Photoshop, Joseph adjusted the size, color, and contrast of the images. He printed the images on photo paper.**

The scans come out as jpeg (.jpg) images and are stored in a folder on the computer's hard drive. As you can see in **fig. 2**, I adjusted the color and contrast of the scans with Adobe Photoshop software. Then I made a test print and compared it to the models, tweaking the enlargement setting on the printer as needed. I wanted my container flats to be the same length and height as my three-dimensional foreground models.

Satisfied with the images, I ran color prints on high quality, white 8½ x 11 photo paper. If you don't have a color printer, you could burn the jpeg files onto a CD and take them to a copy shop for printing.

After printing the color scans, I cut the images apart using a straightedge and hobby knife with a sharp no. 11 blade, as in **fig. 3**. Using spray adhesive, I then attached each print to a piece of ¼" foam core trimmed to fit.

After applying hot glue to the back of the flat (**fig. 4**), I attached it to the backdrop as shown in **fig. 5**. In this photo, you can see that it doesn't take long to fill the backdrop with stacks of containers.

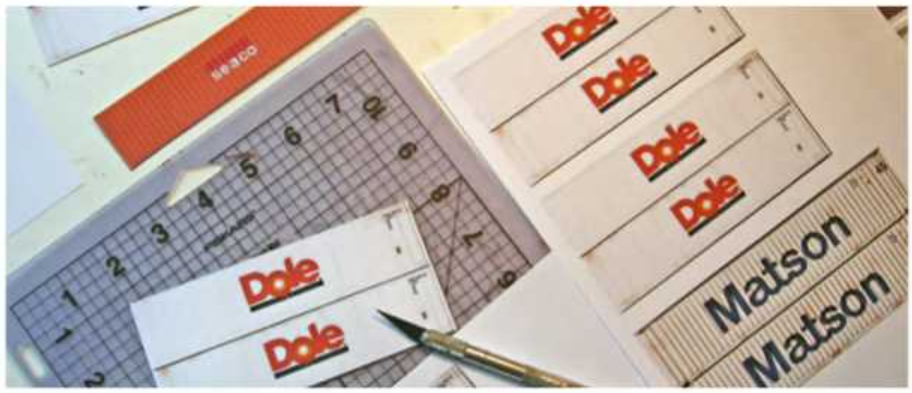


FIG. 3 CUTTING OUT IMAGES. **Joseph cuts out each image with a straightedge and a hobby knife. He makes sure to use a sharp no. 11 blade for the project.**

FIG. 4 MOUNTING THE FLATS. **Each image is mounted to ¼" foam core with spray adhesive. Joseph then attaches the flats to the backdrop with hot glue.**

FINISHING THE SCENE

These techniques would also work well with prototype photos. I used some of the digital prototype photos of containers and cranes that I'd taken of the intermodal yard at the Port of Seattle.

As with the scans of the models, I enlarged and edited the images in Photoshop and then printed them on coated paper. I attached these photos directly to the backdrop with spray adhesive. With a few stacks of 3-D container models in front of the flats, my terminal looks a lot larger than the narrow space that it occupies on my layout. This technique can easily be adapted for other scales. HTMTR

FIG. 5 A SPRAWLING YARD. **Joseph mixes containers of different sizes and paint schemes. It doesn't take long to install flats along the entire backdrop.**

SECTION 6

SCENIC DETAILS

The carefully ballasted and detailed track, as much as the modern Union Pacific diesels running along it, on Pelle Søeborg's former HO scale model railroad help establish a convincing contemporary setting.

Making the right-of-way look modern reinforces a layout's setting

BY DANA KAWALA

MODELING TODAY'S RAILROADS goes beyond simply running modern locomotives and remembering not to add a caboose to end of the train. Often it's the smallest trackside details, and even the track itself, that drives home a layout's time period. In this chapter *Model Railroader* contributing editor Pelle Søeborg describes how he models track and other details to make his layout look like a contemporary prototype.

Pelle shows how he uses photo-editing software to model grade-crossing, highway, and other road signs on page 74. Many Class 1 railroads today lay mainline rails on concrete, rather than wood ties. Pelle describes how he models both wood and concrete ties and offers other track painting and weathering techniques on page 79.

Aside from track ties, concrete is often the preferred building material for much of today's railroad infrastructure. On page 76, Pelle will show you how to build a common low concrete bridge. This type of span is found on railroads all across the country.

Carefully detailed scenes and track really help a model railroad come to life regardless of the era. HTMTR

Prototypical traffic signs add to the realism on Pelle Søeborg's former HO scale railroad. Pelle designs the signs on his computer and prints them on self-adhesive paper.

MAKE EASY ROAD SIGNS

Carefully modeling these simple details adds a lot of realism to a layout

BY PELLE SØEBORG

LITTLE THINGS LIKE ROAD SIGNS can make a big difference to a scene. Any highway, street, or road bigger than a private driveway should have appropriate road signs, or it won't look realistic.

If you have a computer and a color printer, you can make your own model road signs in a jiffy. You can either photograph the real signs and print them out as they are, modify the photos in an image-editing programs such as Adobe Photoshop, or use the prototype pictures as reference and create your own artwork from scratch.

Using the latter approach, I made the artwork for the road signs on my former HO scale layout in Adobe Illustrator. After correctly sizing the signs for HO scale, I print them out on self-adhesive paper. I then peel and stick the paper to .010" styrene sheet and cut out the signs with a sharp pair of scissors.

Follow along as I show you how I make road signs for my layout. HTMTR

STEP 1 DESIGNING THE SIGNS

I DRAW MY ROAD SIGNS ON A COMPUTER using Adobe Illustrator, a drawing program. Since road signs are mostly simple shapes and text, a basic drawing program is all that's needed. I refer to photos of real road signs as a guide when drawing signs for my layout. The size of the sign depends on what kind of road it marks; generally, the larger the road, the larger the sign. See the table below.

Another good reference for contemporary American road signs is the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD), available online in Portable Document Format (PDF) at mutcd.fhwa.dot.gov. A link on that website even gives instructions for copying images from the PDF document, so you can paste them directly into your drawing program for modification.

Since 2003, road sign lettering uses a font called Clearview Bold. If you don't have that font on your computer, almost any bold, sans serif font like Franklin Gothic or Helvetica will do. Though traffic control signs like STOP and YIELD are printed in all capital letters, names of places like towns and national parks are lettered in both upper and lowercase.

SIGN SIZES

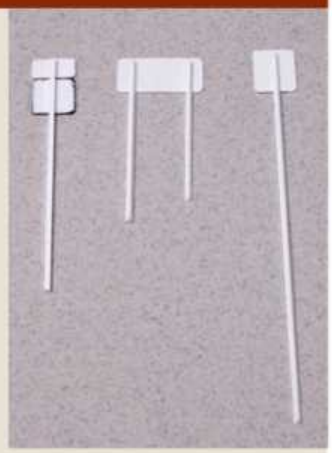
SIGN TYPE	TWO-LANE ROAD	MULTI-LANE ROAD	HIGHWAY	LIMITED-ACCESS HIGHWAY
Stop	30" x 30"	36" x 36"	36" x 36"	–
Speed limit	24" x 30"	30" x 36"	36" x 48"	48" x 60"
Warning signs	30" x 30"	36" x 36"	36" x 36"	36" x 36"
Grade crossing ahead	30" round	30" round	30" round	–
Advisory speed plaque (under warning sign)	18" x 18"	18" x 18"	24" x 24"	30" x 30"
Route signs	24" x 24"	24" x 24"	24" x 24"	24" x 24"

STEP 2 ASSEMBLY AND PLACEMENT

AFTER DRAWING AND SIZING the signs I need, I print them out on self-adhesive label stock using a color inkjet printer set at highest quality. After applying the paper to .010" styrene sheet, I carefully cut the sign out with scissors. I then glue the back to posts cut from lengths of T-shaped styrene stock. To make the posts and sign back look like galvanized metal, I brush paint them light gray.

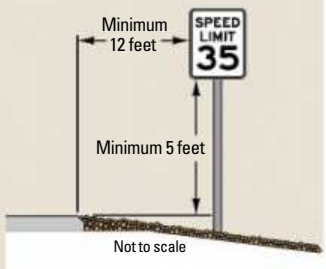
Once the paint dries, it's time to poke some holes in the scenery and glue the signs on the layout. When placing your signs, keep in mind that government regulations specify where they should be placed. For example, the bottom of most signs should be no less than 5 scale feet above the road surface. More information about traffic signs and markings can be found in the Manual on Uniform Traffic Control Devices.

Pelle prints signs on label stock, sticks them to .010" styrene, then cuts them out.



Pelle mounts his signs on styrene posts, painted to resemble galvanized steel.

Pelle creates a wide variety of signs on his computer. The same technique can be used to create other kinds of markers, such as yard limit signs and whistle posts.



These dimensions are for a basic rural application.

A BNSF Ry. freight crosses a modern concrete bridge on Pelle Søeborg's former HO scale layout. Learn how he built and installed the bridge using plaster castings. Photos by the author

BUILD AND INSTALL A MODERN CONCRETE BRIDGE

An easy-to-build plaster kit models this common piece of infrastructure

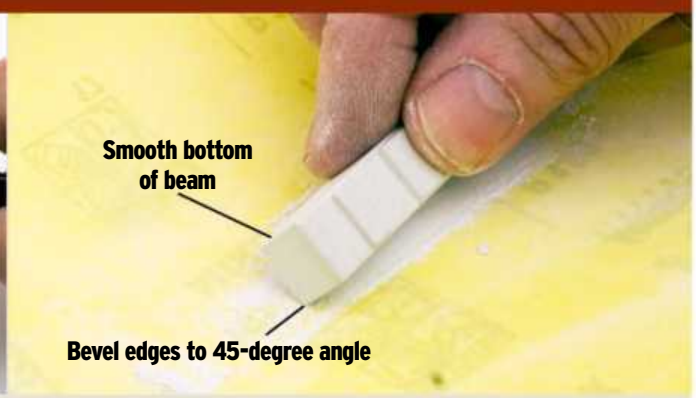
BY PELLE SØEBORG

I LIKE TO WATCH LONG TRAINS roll over big bridges, but my former HO scale layout didn't offer much opportunity for such structures. I had space for a more modest solution, though. In the desert scene opposite Daneville, I installed a concrete bridge over a dry wash.

For this project, I used Scale Segmental Bridge Co.'s type 2 T-girder kit. The bridge uses plaster parts, which I had to modify to fit the available space.

[BLMA also makes an HO scale plastic kit of a concrete segmental bridge that would work for this project. – *Ed.*]

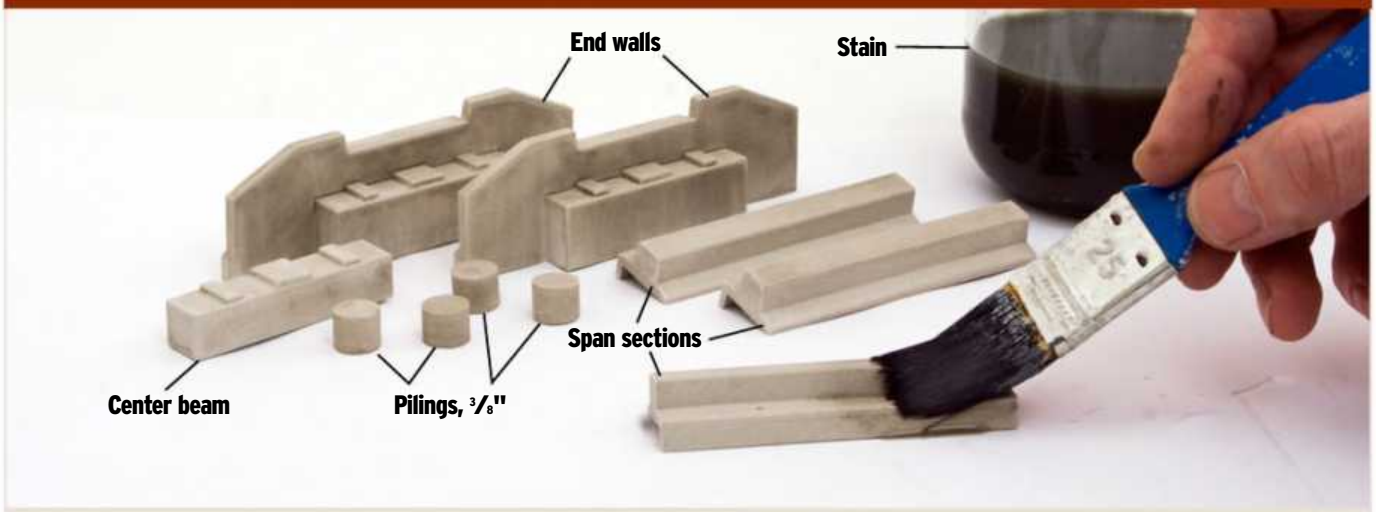
STEP 1 CUTTING TO FIT



THE SCALE SEGMENTAL BRIDGE CO. kit includes four spans, four pilings, two end walls, and one center support beam. The bridge was too tall for the wash it was to span, so I trimmed 3⁄16" off the center support beam with a razor saw. I also shortened the pilings to 3⁄8". I cut the four pieces I needed from one piling.

The razor saw left cut marks in the casting, so I smoothed the bottom of the beam with fine-grit sandpaper. I also used the sandpaper to bevel the edges of the beam to a 45-degree angle. It's important to sand the plaster parts slowly and check your work often. It's difficult to repair plaster if you sand off too much.

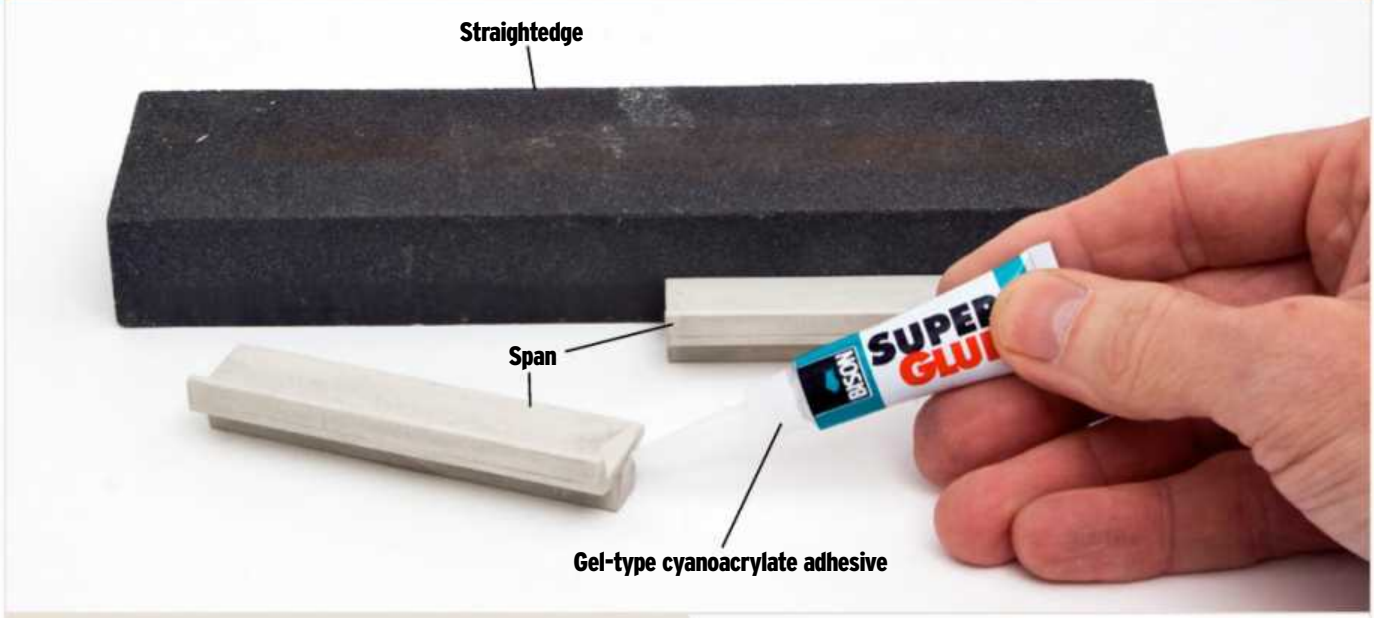
STEP 2 WEATHERING



THE PLASTER CASTINGS are light gray and look like their concrete prototype right out of the box. However, I used a stain to make the castings look more like aged concrete. It's best to stain the plaster parts prior to assembling the kit. Any glue that gets on the surface prior to staining will seal the porous material. This will prevent the stain from penetrating.

I made the stain from water with a few drops of Woodland Scenics Black and Stone Gray Earth Colors liquid pigments mixed in. Before applying the stain, I moistened the castings with a little water. Next, I used a brush to apply two coats of the stain and let the castings dry thoroughly. If the castings aren't completely dry, the glue won't bond properly.

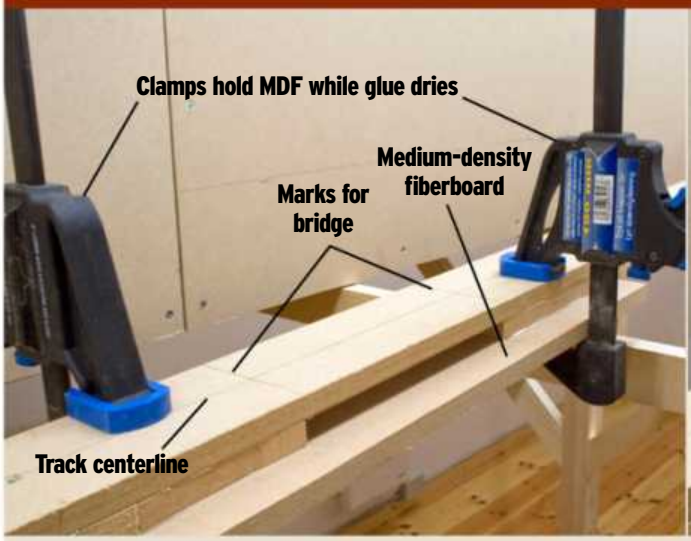
STEP 3 ASSEMBLING THE BRIDGE

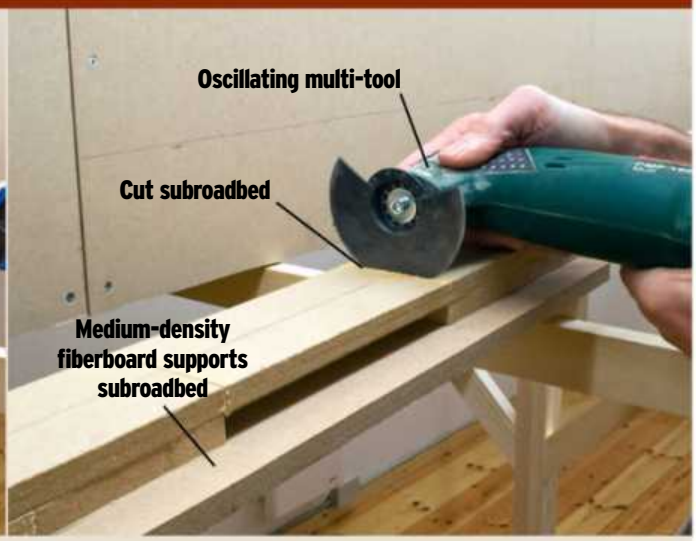


I USED A GEL-TYPE cyanoacrylate adhesive (CA) to assemble the bridge. First I glued the span pieces end to end. For this step, it works best to align the pieces with a straightedge. Then I cemented the two halves of the span together. The CA bonds instantly, so you have to be precise. Once the glue bonds, it's difficult to separate the parts without breaking the castings.

Next, I glued the pilings to the center support. I then cemented the end walls to the span and attached the center support to the bottom of the span. Finally, I attached a piece of cork roadbed to the bridge deck with contact cement, as shown at right.

STEP 4 LAYOUT PREPARATION





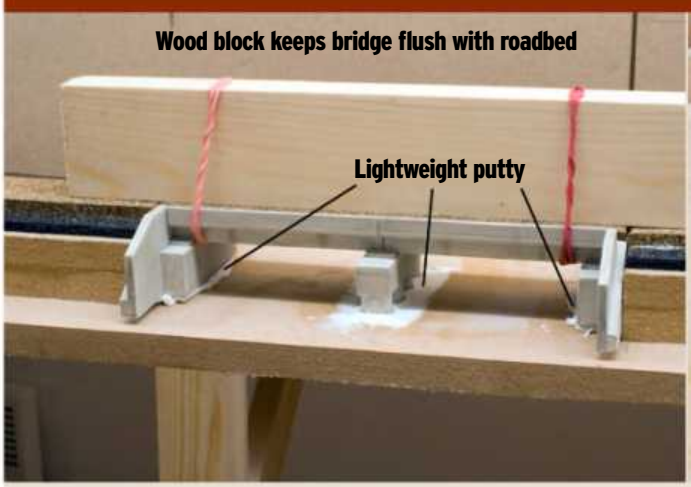
I USED A PENCIL TO MARK the bridge's location on the subroadbed. At each end of the bridge, I attached a piece of medium-density fiberboard (MDF) below the subroadbed. Then I installed another, longer piece of MDF below the opening.

I secured the MDF with carpenter's glue and used clamps to hold the boards in place while the glue dried. Attaching MDF to the subroadbed provides extra rigidity and helps ensure that the subroadbed will stay in place after the gap for the bridge is cut, as shown in the next photo.

When the glue was dry, I cut out the section of the subroadbed where the bridge will be located with an oscillating multi-tool. It's important to make the cut carefully so the blade doesn't damage the piece of MDF below the opening.

Be sure to wear proper eye and ear protection when working with power tools. It's also a good idea to work in a well-ventilated area and wear a respirator when cutting MDF. The man-made material contains an assortment of wax and resin binders and can generate a lot of dust when cut.

STEP 5 INSTALLATION



AFTER I INSTALLED the cork roadbed, I applied a layer of lightweight putty (joint compound or spackle would also work) at the ends and center of the cutout. This helped bring the abutments and pilings to the correct height. I filled in the gaps below the abutments with foam, as shown in the next photo.

To bring the bridge deck flush with the roadbed, I attached a wood block to the top of the bridge with rubber bands and placed the bridge in the opening. You can do any final leveling of the cork roadbed with a Surform rasp and sanding sponges after the putty has dried.

When the putty had dried, I cut the rubber bands and removed the wood block. I used extruded-foam insulation board for the surrounding terrain. I started by roughly cutting out the banks with a long-bladed hobby knife. I then sanded all joints and cut marks with coarse sandpaper. After I finished shaping the terrain, I filled in any gaps with lightweight putty.

I finished the scenery by applying ground foam, shrubs, and weeds that matched the scenery on the rest of my model railroad. A concrete segmental bridge is a common structure on today's railroads and makes a great railfanning spot on a modern-era layout. HTMTR

By applying a few simple painting, weathering, and ballasting steps, author Pelle Søeborg makes it hard to overlook the distinction between mainline trackwork and sidings on this contemporary HO scale layout.

HOW TO MAKE TRACK LOOK REALISTIC

Use simple painting and weathering techniques to give rails and ties an authentic appearance

BY PELLE SØEBORG
PHOTOS BY THE AUTHOR

EVEN THOUGH TRACKWORK is one the most visible components of any model railroad, I've found that most layout builders aren't likely to spend as much time or effort improving its appearance. However, modeling a realistic main line, as well as spurs and sidings, is just as important to me as adding details and subtle weathering effects to locomotives, rolling stock, and structures. I want my track to look as good as my other models.

While there's plenty of flextrack to address on my new layout, it really doesn't take much time or extraordinary effort to give the rails and ties an authentic appearance. In some ways, it's even easier than detailing other railroad models. There's not much more to it than using a small brush to paint track to resemble yard or mainline sections with wood or concrete ties.

And when it comes to weathering my track, the effort here is minimal too. Powdered pastels applied with a soft paintbrush helps provide subtle grime and rust effects that don't detract from the uniform look of a modern-era Class 1 main line.

All told, the monotony of repeating these steps over numerous feet of track is perhaps the biggest challenge, but the resulting realistic appearance makes it easier to forge ahead. Just turn the page to see the simple steps you can use to enhance your layout trackwork.

PAINTING TRACK

USING AN AIRBRUSH to apply a brownish coat of paint is an effective way to improve the appearance of your track. That's all I did on my first Daneville & Donner River layout. But when I added a few more effects on my next layout, the flextrack looked even more realistic.

Most of my mainline track has concrete ties. Here, I airbrushed a concrete color consisting of equal parts Model Master Gull Gray, Sand, and White. After the paint dried, I used a brush to paint the rail and the clips holding the rail with a grimy grayish-brown color mixed from three parts Dark Drab, three parts Dark Skin, and one part Gull Gray.

For tracks and turnouts with wood ties, I airbrushed a base coat of light gray. I made a tie color by mixing one part Vallejo Model Air Camouflage Black Brown with one part Gray Green.

TRACK PAINTING PREP

1. Before painting the track, Pelle slipped pieces of foam insulation board between the open switch point and stock rail on all turnouts. This helps prevent paint from interfering with the electrical contact between the parts.

2. To contain most of the airborne paint particles, Pelle clamped the vacuum cleaner hose to the benchwork near his work area and turned it on while using the airbrush. He also covered adjacent areas with plastic drop cloths.

PAINTING TRACK WITH CONCRETE TIES

1. Using an airbrush, Pelle painted all of the concrete track with two coats of his custom concrete color, equal parts Model Master Gull Gray, Sand, and White.

2. Because Pelle painted all concrete track at the same time, some of the paint dried on the rails before he completed the task. He used a chisel blade to scrape paint off the railheads.

3. To remove any remaining paint residue, Pelle dipped a piece of cloth into paint thinner (mineral spirits) and used it to wipe along the tops of the rails.

4. Pelle used a small brush to paint the rail web and rail clips a grayish-brown mix of three parts Model Master Dark Drab, three parts Dark Skin, and one part Gull Gray.

I used tap water and a few drops of isopropyl alcohol to thin the mix. I applied a single coat of this wash to the ties on secondary track and sidings, while the mainline track received two coats.

Next, I brush-painted the rails on secondary track and sidings with a grimy grayish-brown color mixed from two parts Model Master Dark Drab and one part Gull Gray. For the mainline rails over wood ties, I applied the same color I used on track with concrete ties.

I found paint doesn't always adhere well to plastic ties. Be sure to allow the paint to dry thoroughly before adding ballast. When applying ballast, avoid brushing the ties too hard or you'll risk accidently scraping the paint off them.

Adding a few steps to the painting process is an easy path for making remarkably realistic trackwork.

PAINTING TRACK WITH WOOD TIES

1. After covering a previously painted and installed trestle to protect it from overspray, Pelle used an airbrush to paint the ties and rails light gray.

2. Next, Pelle used a brush to stain the ties with a mix of equal parts Vallejo Camouflage Black Brown and Gray Green thinned with tap water and a few drops of isopropyl alcohol.

3. Pelle used a small brush to paint the rail on the secondary track and sidings with a grimy brown color mix of two parts Model Master Dark Drab and one part Gull Gray.

4. This close-up photo shows the resulting appearance of flextrack with wood ties. Note how the brown stain helps highlight wood grain details molded into the plastic ties.

WEATHERING AND BALLASTING TRACK

RAILS AND TIES, especially those made of concrete, need a little weathering to look realistic. I weathered the rails on concrete track with brown-colored powdered pastels. Trackwork with wood ties doesn't need additional weathering.

On some of the turnouts, I applied rust-colored powder to the tie plates and other "metal" parts. I didn't find it necessary to seal the pastels with varnish, as the pastels stick well to the previously applied coats of flat finish paint.

When it comes to selecting ballast, I like to use different colors to represent new or old stone. Along the main line, I use a mixture of two equals parts Arizona Rock & Mineral NP Medium Gray and CSX/SP. To ballast secondary tracks I use an equal blend of Arizona Rock & Mineral NP Medium Gray and ASOA (www.asoa.de) Gneisschotter.

Finally, as a matter of preference and convenience, I apply both ground covering and ballast in the same work session.

ADD WEATHERING EFFECTS

1. Using a soft brush, Pelle applied a small amount of powdered brown pastels along the rails. He didn't need to seal the pastels with varnish, as the pastels adhered well to the paint.

2. On turnouts, Pelle used a small soft brush to apply rust-colored powdered pastels to the tie plates, along with other "metal" components.

APPLYING BALLAST

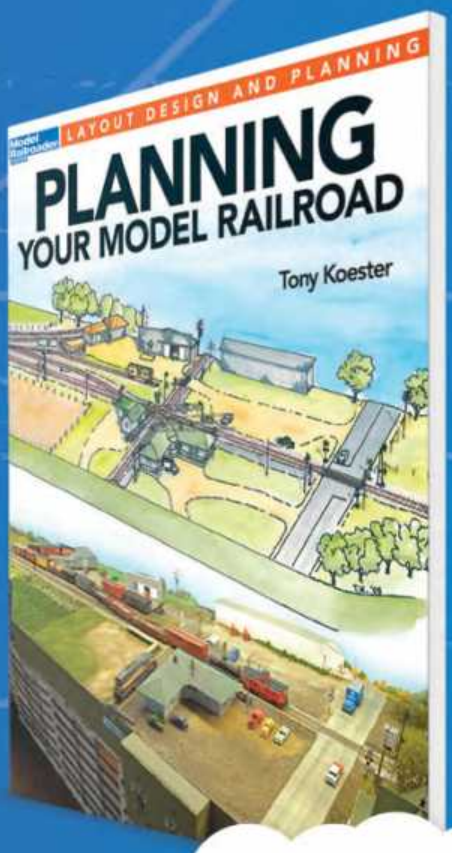
1. Pelle used a 35mm film canister to apply ballast in an easily controlled flow. A wide, soft brush is helpful for moving ballast off the ties.

2. Where ballast clung to the track, Pelle used the brush handle to tap the rail and dislodge stubborn granules. He also used a fine soft brush to wipe off any loose ballast.

3. To secure the ballast and ground cover in the same process, Pelle used a pipette to first apply a mix of water and isopropyl alcohol (3 parts tap water, 1 part alcohol) to the entire area.

4. While the area was damp, Pelle used a pipette to drizzle Scenic Cement over the ballast and ground cover. The water/alcohol mix ensures the cement penetrates the scenery layer. He let the scene dry overnight. HTMTR

Helping You Find Focus To Achieve Your Dreams



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